THE INTELLECTUAL STATUS OF CHILDREN WHO ARE PUBLIC CHARGES

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CONTENTS

THE INTELLECTUAL STATUS OF CHILDREN WHO ARE PUBLIC CHARGES

The Children Measured

Two hundred and sixty-five children, including one hundred and eighty-three boys and eighty-two girls, were measured. They comprised about three fourths of the children from 9 years 0 months to 16 years 0 months who were, at the time of the investigation, public charges in a certain county. The selection was random except that none of the dependent children sent from the county to the state institution for the care of the feeble-minded were included, and that a few children under nine were tested who probably represented a superior selection from the seven- and eight-year olds.[1] Apart from these, the only selective factor was the omission of some of the smaller institutions *in toto* from the inquiry.

A child may, in the county in question, become a public charge by commitment by an officer of the poor-law on grounds of destitution, or by an officer of the courts on grounds of delinquency; but the line of distinction between the two classes is not at all sharp. The decisive factor is often simply whether the parents are more successful in getting justices to commit their children than in getting poor-law officers to do so.

A comparison of the measurements of the children committed for delinquency with those committed for destitution shows no demonstrable difference either in the tests of abstract intellect or in the mechanical test. So we shall, from now on, for brevity's sake, refer to all these children as "dependent" children.

The Tests Used

The Stenquist Test of Mechanical Ability, or Construction Test

The purpose of this test is to measure the child's mechanical ability, the aim being to get as far as possible away from dependence upon the child's ability to read and write and to deal with heard words. The general plan is to measure his ability to select the neces-

[1] These were probably in some measure sent to be measured by the officers of the institution, because they were in classes with older children, or seemed as old as the older children.

sary parts and to put them together properly so as to make certain things, there being seven such tasks, graded in difficulty. The things to be made appear in the upper half of Fig. 1; the parts from which they were to be made appear in the lower half of Fig. 1.

The test materials were contained in a wood-lined corrugated paper box, 14 by 16 by 2 inches, with a wood partition through the middle as shown in the illustration, Fig. 1.

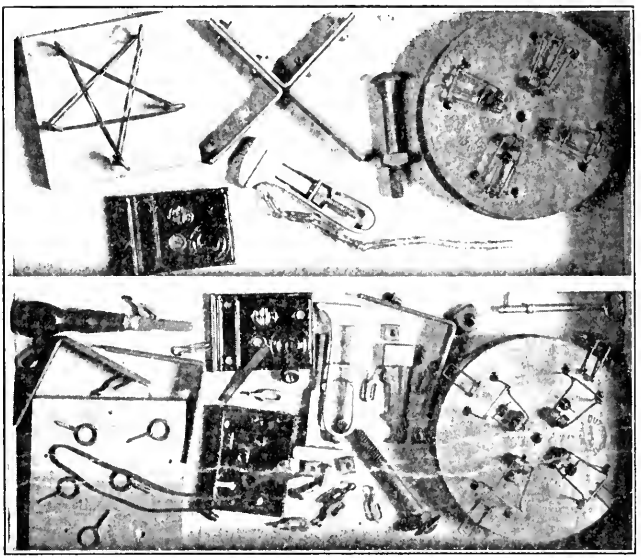

FIG. 1.

They comprise two each of seven mechanical models as listed below and more clearly illustrated under "Standards for Grading."

Model *A*:
A $\frac{3}{8}$ in. by 3 in. carriage bolt with nut ..... 2 parts.
Model *B*:
A small cast-iron monkey wrench, 4 in. long ..... 3 parts.
Model *C*:
Three identical wrought iron angle irons, $2\frac{1}{2}$ in. by $\frac{3}{4}$ in.; four $\frac{1}{8}$ in. by $\frac{1}{2}$ in. round head stove bolts, arranged in position shown ..... 11 parts.
Model *D*:
An ordinary 4-way mouse trap ..... 1 part.
Model *E*:
Ten links of brass safety chain No. 2 ..... 10 parts.
Model *F*:
One piece whitewood 4 in. by 4 in. by $\frac{1}{2}$ in., drilled with 5 holes, as shown, to form five-pointed star, radius $3\frac{3}{8}$ in. Five $\frac{5}{8}$ in. screw eyes. One $3\frac{1}{2}$ in. rubber band ..... 7 parts.
Model *G*:

A simple single-bolt door lock 2 in. by $2\frac{3}{4}$ in. by $\frac{5}{8}$ in. ..... 6 parts.
Tools:
One (for complete set) $4\frac{1}{2}$ in. screw driver

Twenty-four children were arranged, one in a seat, in an ordinary classroom. Each child was required to fill out the Record Sheet blank shown below.

CONSTRUCTION TEST

Record Sheet

Write your name here .....

Are you a boy or girl? .....

How old were you on your last birthday? .....

What is your teacher's name? .....

What is the number on your box? .....

Do not write anything below this line.

Date .....

School .....

Time:

Setting up .....minutes ..... seconds

Taking down ..... minutes .....seconds

Quality of achievement on basis of 0 to 10:

Model	*A*	*B*	*C*	*D*	*E*	*F*	*G*
Grade	.....	.....	.....	.....	.....	.....	.....

After this blank has been filled out, the following instructions were given: "Lay the paper which you have just filled out on top of your desk near one edge where you can get it easily later." The twenty-four boxes containing the test materials were then distributed. Holding up one of the boxes before them, directions were given as follows: "Turn the box which you have on your desk so that the letter 'F' is toward you. Do not look into the box till I say go.[2] Each one of these boxes is divided into two parts (indicating by gesture how the partition extended across the middle of the box). In

[2] We found it necessary to be very vigilant in keeping the subjects from opening the boxes before the signal was given, as the pressure of curiosity became very great.

the compartment or part farthest away from you there are seven mechanical models, *i. e.*, seven mechanical things; one of them is a bolt with a nut on it; another is a small wrench; another a small chain; and there are four other things.

"In the part nearest to you there are seven mechanical things just like the others except these are all taken apart. I want you to take all the parts in the compartment nearest you and make seven mechanical things exactly like the ones in the compartment farthest away from you as quickly as you can. As soon as you have finished them all, raise your hand; and we will write on your record sheet just how long it took you to do them all.

"Begin with the one that looks the easiest.

"If you want to take apart any of the models to see how they are made you may do so, but you must put them together again. Screw all the nuts up tight; don't leave them half on, but don't use the wrench to tighten them with. Do you understand?" (Repeated if necessary.)

"You will now get ready. Grasp the sides of the box so that you can take the cover off quickly when I tell you to. Are you all ready? Go!"

The instructions being somewhat long, we found it necessary after the children began to work to give also the following instructions: this was done after three minutes.

"Do the ones that you think are the easiest first. Screw all nuts up tight with your fingers but do not use the wrench."

We found that two examiners could manage twenty-four subjects. As soon as a hand was raised, the examiner noted the time from his stop-watch, walked over and entered it on the record sheet of that pupil. The pupil then replaced everything in the box and put his record sheet in the box ready to be graded.

At the end of 30 minutes all children were required to stop work.

The pupil's achievement with each of the seven models was graded on a basis of 0 to 10, as shown in the standards below. All seven models made perfectly in the full 30 minutes then gives a score of 10×7, or 70. An arbitrary value of 1 was given every "gain-minute"—*i. e.*, for every minute of the 30 that remained after the subject had completed the test. For example, if the subject completed the test in 16 minutes, 12 seconds, 14 points were added to his score. Fractions less than one half minute were neglected. Fractions of more than one half minute were counted as 1.

We found that after a little practise, and with skilled management of boy helpers, one examiner and four boy helpers can grade the twenty-four sets in about 40 minutes.

The illustrations that follow show the value that was assigned to each degree of achievement. It is true that in some cases, as for example in Model *G*, the degrees shown here are not exhaustive. Where an attempted solution was not exactly of any one of the standard types, the grade for the type most like it was given.

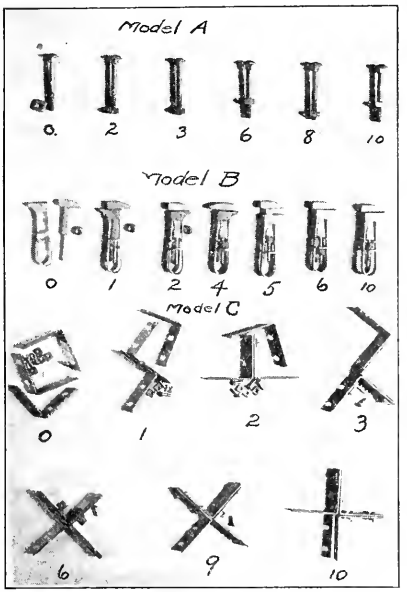

FIG. 2. Standards for Grading Models *A*, *B* and *C*.

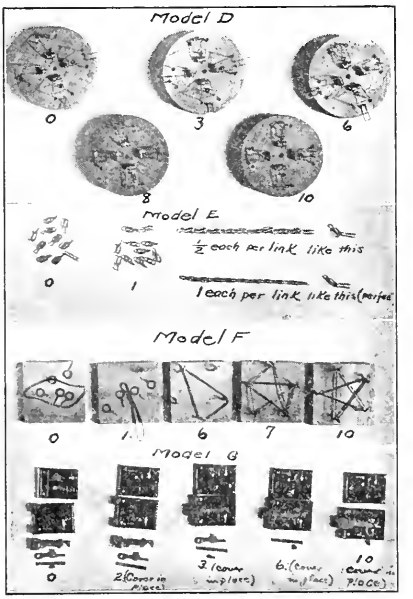

FIG. 3. Standards for Grading Models *D*, *E*, *F* and *G*.

We have then for each child a record like the following samples:

	Score Attained with Model							Credit for Time	Total Score
		A	B	C	D	E	F	G		
Individual	1....	10	10	4	3	0	0	0	0	27
"	2....	10	10	10	10	10	10	3	0	63
"	3....	10	10	10	10	10	10	10	8	78

In order to compare these dependent and delinquent children with ordinary children it is necessary to have knowledge of the achievement of ordinary children with the same test given under the same conditions. The knowledge was obtained as follows:

Four hundred and thirty-two children in two New York City public schools[3] ranging in age from 6 years to 16 years were tested in

[3] These schools are frequented by children of parents of (roughly) the small shopkeeper, artisan, and day-laborer classes. The school work is very efficient. We desire to express here our appreciation of the cordial cooperation of Mr. W. H. Maxwell, superintendent of schools of New York City, and of Mr. C. B. Jameson and Miss Ida Ikelheimer, principals of public schools 43 and 68.

exactly the same way as were the dependent children. The resulting scores are indicated in Table I. Calculating the median score obtained by each age group we obtain the following (6 = 6 up to 7, etc.):

Ages:	6	7	8	9	10	11	12	13	14	15
Medians:	34.5	33.75	42.5	51.25	59.3	62.5	66.78	76.4	77.5	82.5

From these data we estimated the probable true central tendencies for these ages as follows:

20	32	42	50	57	63	69	75	79	82

The discrepancies between the obtained medians and the corrected medians are due to the allowance for the fact that the six- and seven-year-olds tested were a selection of specially bright children.

A more exact series of standards for the different ages could have been obtained by determining empirically the allowance to be made for the correlation between progress in school and ability in this test within those of the same age. The labor involved would be great, however, and the gain in exactness small. So it seemed best to use approximate estimates here, reserving a more exact determination of standards until such time as at least a thousand children could be tested.

The construction test evidently needs extension by more difficult tasks than *G*, since after the age of about 12.0, the children of median ability or better can all do the work with practical perfection, so that the score becomes in large measure one of speed of work only. This does not much affect its value as a measure of the mechanical ability of the dependent and delinquent group; for, as we shall see, they do not often enough attain scores of 70 or more.

From these probable true central tendencies or corrected medians the standard scores of Table II. for each year and fraction thereof were obtained. The scores to fit ages below 6.5 and above 15.5 are frankly only estimates.

We then computed the "construction age" of any child by finding that age in Table II. corresponding in score to the score of the child in question. For example, a child receiving a score of 40 is, by the table, 8 years and 3 months, which is here considered as 8.25 years. In cases where the same score appears for several ages, the mid-point was taken. For the three examples of scores noted above (27, 63 and 78) the "construction ages" were thus *7.1*, *11.5*, and *14.3*.

TABLE I

FREQUENCIES OF SCORES ATTAINED BY 432 ORDINARY CHILDREN AS TESTED IN A PUBLIC SCHOOL OF NEW YORK CITY. ARRANGED BY AGES.
6 = 6.0 UP TO 7; 7 = 7.0 UP TO 8, ETC.

Score	Age 6	7	8	9	10	11	12	13	14	15	16
4	.....	1									
5	.....	1									
6	.....	1									
7	.....	1									
8	1		1								
9	.....										
10	1		1								
11	.....	1									
12	.....										
13	.....	2	2								
14	.....	2	2								
15	1	1			1						
16	.....	1		1							
17	.....		2								
18	.....	1									
19	.....	1			1						
20	.....	1	1	1							
21	.....	2									
22	1	3	3		1			1			
23	.....		1	1	2	1					
24	2	1	1	1							
25	.....	1	3		2		1				
26	2		2		1						
27	.....	4	1			2					
28	8	1		2	1						
29	.....		2								
30	1	2	1	1							
31	.....	1	1	1							
32	.....	1	1	1							
33	.....		3								
34	.....		1			1					
35	.....		1	2	1	1					
36	2	2		1	3						
37	2	2	1			1		1			
38	.....			1	3		1				
39	.....	1	1								
40	.....	1	1	1	4			1			
41	.....		1			1	2				
42	.....			3		2					
43	.....	1	5	1		5	1	2			
44	.....	2	1	4	1	1					
45	.....	1	2	3	1					1	
46	1	3	1					1	1		
47	1	1	1		1			1			
48	1	2	2	3	2	1	2				

TABLE I Continued

Score	Age 6	7	8	9	10	11	12	13	14	15	16
49		2	2	1	1						
50		1	2	2				1			
51	1	1			1	1					
52			1	6	1	1					
53			1		2			3			
54			2				1	1			
55	1	1	1	1	2	2		1	1		
56	1	1	1	1	3	1		1		1	
57		2		2	1						
58			1	2	1	2		1			
59			2			2					
60		1	3	1	1		1		1		
61			1	1	2						
62			1	1	1				1		
63			1	3	3	2					
64		1		1	3	2	1				
65				1	1	2	2				
66		2			1						
67			4	1	3						
68			1	1	2	1	1				
69				2	3	1					
70				2	1	1		1			
71				1	1	2		1	1	3	
72				2		1	1				
73					1		1		1		
74							1	1			
75					2	1		3			
76						2	1	1		1	
77					3	1		1	1		
78			1		3		1	1	3		
79						1		1		1	
80				1	2		2	3	1		
81							1	1		1	
82				1	1	6		2	1	1	
83						1	1			1	
84			1			1		2	2	1	
85					1	2		1			
86					1					1	
87								2			
88						1		3		4	
89								1			
90									1		
91									1		
92											1

TABLE II

CONSTRUCTION AGE-GRADE STANDARD SCORES

Year	Month	Decimal	Score	Year	Month	Decimal	Score	Year	Month	Decimal	Score	Year	Month	Decimal	Score	Year	Month	Decimal	Score
5	0	.0		8	0	.0	37	11	0	.0	60	14	0	.0	77	17	0	.0	87
	1	.1			1	.1	38		1	.1	60		1	.1	77		1	.1	87
	2	.2			2	.2	39		2	.2	61		2	.2	77		2	.2	88
	3	.3			3	.3	40		3	.3	61		3	.3	78		3	.3	88
	4	.3			4	.3	41		4	.3	62		4	.3	78		4	.3	88
	5	.4			5	.4	42		5	.4	62		5	.4	78		5	.4	88
	6	.5	10		6	.5	42		6	.5	63		6	.5	79		6	.5	88
	7	.6	11		7	.6	43		7	.6	64		7	.6	79		7	.6	88
	8	.7	12		8	.7	43		8	.7	65		8	.7	79		8	.7	88
	9	.8	13		9	.8	44		9	.8	65		9	.8	80		9	.8	88
	10	.8	14		10	.8	44		10	.8	66		10	.8	80		10	.8	89
	11	.9	15		11	.9	45		11	.9	66		11	.9	80		11	.9	89
6	0	.0	16	9	0	.0	46	12	0	.0	66	15	0	.0	81	18	0	.0	89
	1	.1	16		1	.1	46		1	.1	67		1	.1	81		1	.1	89
	2	.2	17		2	.2	47		2	.2	67		2	.2	81		2	.2	89
	3	.3	17		3	.3	48		3	.3	67		3	.3	81		3	.3	90
	4	.3	18		4	.3	49		4	.3	68		4	.3	82		4	.3	90
	5	.4	19		5	.4	49		5	.4	68		5	.4	82		5	.4	90
	6	.5	20		6	.5	50		6	.5	69		6	.5	82		6	.5	
	7	.6	21		7	.6	50		7	.6	70		7	.6	82		7	.6	
	8	.7	22		8	.7	51		8	.7	70		8	.7	82		8	.2	
	9	.8	23		9	.8	52		9	.8	71		9	.8	83		9	.8	
	10	.8	24		10	.8	52		10	.8	71		10	.8	83		10	.8	
	11	.9	25		11	.9	53		11	.9	72		11	.9	83		11	.9	
7	0	.0	26	10	0	.0	53	13	0	.0	72	16	0	.0	83	19	0	.0	
	1	.1	27		1	.1	54		1	.1	73		1	.1	83		1	.1	
	2	.2	28		2	.2	54		2	.2	73		2	.2	83		2	.2	
	3	.3	29		3	.3	55		3	.3	74		3	.3	84		3	.3	
	4	.3	30		4	.3	56		4	.3	74		4	.3	84		4	.3	
	5	.4	31		5	.4	56		5	.4	74		5	.4	84		5	.4	
	6	.5	32		6	.5	57		6	.5	75		6	.5	84		6	.5	
	7	.6	32		7	.6	57		7	.6	75		7	.6	85		7	.6	
	8	.7	22		8	.7	51		8	.7	70		8	.7	82		8	.7	
	9	.8	34		9	.8	58		9	.8	76		9	.8	85		9	.8	
	10	.8	35		10	.8	59		10	.8	76		10	.8	86		10	.8	
	11	.9	36		11	.9	59		11	.9	76		11	.9	86		11	.9	

The Trabue Completion Test

The series of fifty-six sentences with omitted words to be completed, as shown below, formed the second test. This test frankly measures intellect as applied to word meanings and relations. It is

known to be symptomatic of success with school work in general, and differentiates very clearly a group of twenty dull adults from a group of professional men. We shall refer to it as the omitted-word test, or completion test. This series on the plan of the Ebbinghaus combination test was devised by Mr. Trabue. The method of administering it and scoring it was as follows:

Write words in the empty spaces to make the whole sentence sound sensible and right

1. See ..... man and the little boy.
2. We like good boys ..... girls.
3. She ..... if she will.
4. Here is a man who ..... do it.
5. The bird ..... a song every morning.
6. The stars and the ..... will shine to-night.
7. Good boys ..... kind ..... their sisters.
8. The wind ..... the dust into our eyes.
9. The best ..... to sleep is at night.
10. It is good to hear ..... voice ..... friend.
11. During the ..... weather the boys play in the shade.
12. The kind lady ..... the poor man a dollar.
13. The little ..... and his dog ..... running a race.
14. The girl fell and ..... her head.
15. The baby's toes are very .....
16. The rude child does not ..... many friends.
17. The boy will ..... his hand if ..... plays with fire.
18. Boys must ..... be rude to ..... mothers.
19. The stars ..... brightly at .....
20. The child .... the river ..... was drowned.
21. Boys who play .... mud get their hands .....
22. The poor baby ..... as if it were ..... sick.
23. When the ..... grows older he ..... be a man.
24. The ..... plays ..... her dolls all day.
25. The ..... rises ..... the morning and ..... at night.
26. The boy who ..... hard ..... do well.
27. The poor little ..... has ..... nothing to .....; he is hungry.

Write words in the empty spaces to make the whole sentence sound sensible and right

28. ..... weather usually ..... a good effect ..... one's spirits.
29. To ..... friends is always ..... the ..... it takes.
30. ..... are times in the ..... of almost ..... of us when we ..... for a long life.
31. Men ..... usually more ..... to do heavy work ..... women.
32. It is very ..... to become ..... acquainted ..... persons who ..... timid.
33. A shelter ..... the weather is ..... appreciated on a ..... day.

34. The best advice ..... usually ..... obtained ..... one's parents.
35. A home is ..... merely a place ..... one ..... live comfortably.
36. It is a ..... task to be kind to every beggar .... for money.
37. One's real ..... usually appears ..... often in his ..... than in his speech.
38. ..... things are ..... satisfying to an ordinary ..... than congenial friends.
39. The sun is so ..... that one can not .... directly ..... causing great discomfort to the eyes.
40. Brothers and sisters ..... always ..... to help ..... other and should ..... quarrel.
41. Sometimes ..... friends would really ..... us more by doing ..... than by ..... to assist us.
42. One can ..... much better ..... when he is ..... worried ..... other matters.
43. Many persons ..... before they think, and ..... do not ..... at all; they only talk.
44. When two persons ..... about ..... which neither understands, they ..... almost ..... to disagree.

Write words in the empty spaces to make the whole sentence sound sensible and right

45. If a person injures one by ....., without having intended any ....., one should ..... insulted.
46. It is very annoying to .... tooth-ache, ... often comes at the most ..... time imaginable.
47. .... strange that ..... people should show so much ..... and ..... so ..... excitement when a sudden loud ..... is heard.
48. When one feels drowsy and ....., it ..... happens that he is ..... to fix his attention very successfully ..... anything.
49. Good company ..... it is a great deal ..... for an ordinary man to enjoy a ..... from work.
50. Children should ..... that after all nobody is ..... to care much more ..... their success than .... parents.
51. If people ..... spend their ..... and ..... more carefully, they could probably save ..... than ..... usually do.
52. To ..... many things ..... ever finishing any of them ..... a ..... habit.
53. The knowledge of .... use fire is ..... of ..... important things known by ..... but unknown ..... animals.
54. One ..... be very careful in ..... advice to unknown persons, for one can ..... tell how ..... a stranger may ..... one's advice.
55. One ought to ..... great care to ..... the right ..... of ....., for one who ..... bad habits ..... it ..... to get away from them.
56. ..... that are ..... to one by an ..... friend should be pardoned ..... readily than injuries done by one ..... is not angry.

The children were seated at the desks of their regular classroom and provided with pencils. The examiner stood at the front of the room with a set of the test papers in his hand and made the following explanations:

"I shall give each of you three sheets of paper like these I hold in my hand. Please write your name and your age on the back of each sheet. I shall place them on your desk face downward, for I do not want you to read what is printed on the other side until we can all begin at once. Please do no turn the papers over until I ask you to do so. Just write your name and your age at the top of the back side of each one of the sheets as they are placed on your desk."

The examiner then placed face downward on each child's desk a complete set of papers, arranged in order. As he passed them out he again asked them to write their names and ages plainly on each of the three sheets and not to look at the printed side. After the names were all written and everyone was ready again, he explained as follows:

"When I tell you to turn your papers, you will find on the other side some sentences which are not quite complete,—one or two words have been left out, like this." Here the examiner turned to the blackboard and wrote this sentence: "I see ..... eat." He then asked the children to guess what word had been left out. When someone guessed it as "a" and someone else as "the," he had the children to vote on which word he should write in the blank and then wrote the one they selected. He then wrote another sentence: "It ..... a white cat." As soon as some child said "is," the examiner repeated, "'It *is* a white cat.' We only need to write the word 'is' on the little dotted line and we have a good sentence. Now when I tell you to turn your papers you will find on them such sentences as I have written on the board, and I want you to write a word in each blank so as to make good sentences out of them. Put one word in each blank, so that the sentence will sound right and make good sense. Think carefully about each blank so that you will be sure to get the very best word possible. Fill just as many blanks as you can, and fill them just as well as you can. I shall take up the papers in just thirty-five minutes from the time you start, but if anyone gets through in less time he can bring me his paper and get credit for finishing ahead of time. Do not waste time by worrying over a hard sentence. The first page has the easiest sentences and the third page has the hardest ones, so begin with the first page. Now, turn your papers over and see how well you can fill the blanks."

With the smaller children it was sometimes necessary to give some individual instruction, but such cases were very rare. If the child

had not understood from the class explanation, it was almost impossible to make him understand by individual help. The examiner always went about the room, however, to do what he could for such cases. If any child finished the three sheets in less than thirty-five minutes, they were taken up and the time was recorded on his first sheet. Thirty-five minutes from the time the children began work, all papers were collected, whether completed or not.

Each child's paper was given a score for each of the fifty-six sentences, each sentence receiving a grade of 5 if perfectly completed, and 0 if not sensible at all. In cases where no words at all were written in the blanks of a sentence, this fact was indicated and given somewhat different treatment from those sentences in which words had been written without making sense. If the sentence as completed by the child was only slightly imperfect, a grade of 4 was given it. When the words supplied seemed to indicate that at least a part of the real meaning of the sentence had been grasped, even though the sentence as a whole was very crude and incomplete, a grade of 1 was given it, and for a slightly better quality a grade of 2 was given. A grade of 3 usually indicated a sentence in which every word written by the child had some reasonable connection with the printed parts of the sentence, although the sentence as a whole was very much inferior to the quality graded 5.

Even with such an outline of the scheme to follow in assigning grades to the sentence, it is doubtful whether two persons would always agree in the values they assigned to some sentences, or even whether the same person would agree with himself at two different times. In an effort to make the grading consistent an objective scale of values was made out for each of the fifty-six sentences, indicating in the case of each sentence that anything equal to the samples under *5* was to be given a grade of 5, and that anything poorer than the highest samples and yet better than the poorest samples under *4* was to be given a grade of 4, etc.

Such a determination of values is necessarily arbitrary and would seem unfair in some ways, but the important thing is to be consistent, which is most easily done by having some objective record to which one can refer. The scheme given below for sentence 30 is typical of the sort of scale that had to be made out for each sentence.

"*There* are times in the *lives* of almost *all* of us when we *wish* for a long life," is by this scheme considered the best rendering of this sentence, although "when we *pray* for a long life" is given just the same score. The asterisk in parenthesis (*), after the word "wish" in the "wish, hope, long, pray" group under *5*, indicates that the word preceding it will thereafter be used as a key word to indicate

30. ..... are times in the ..... of almost ..... of us when we ..... for a long life.

5

There ..... lives ..... all ..... { wish (*) / hope / long / pray }

There ..... { experience / life (*) / history } ..... everyone ..... wish*

4

There ..... life* ..... all ..... wish*

There ..... lives ..... all ..... { ask / seek (*) / look / pine / prepare / wished / fight }

There ..... { lives ..... all / life* ..... everyone } ..... { wish* / seek* }

There ..... { minds / days (*) / years } ..... all ..... wish*

3

There ..... days* ..... all ..... seek*

There ..... { midst / heart (*) / world / soul / —— } ..... all .....wish*

There ..... days* ..... any ..... seek*

There ..... life* ..... { all / any } ..... { want / live (*) / suffer }

There ..... lives ..... { many / every } ..... seek*

There ..... lives ..... all ..... { good / —— }

2

There ..... hearts* ..... all .....live*

Hard ..... lives ..... everyone ..... wish*

There ..... days* ..... all ..... { live* / die }

There ..... day ..... { all ..... { live* / time } / one ..... ask }

Their ..... future ..... all ..... live

There ..... { hearts* / —— } ..... (——) ..... wish*

1

There ..... hearts* ..... (———) ..... live
There ..... day ..... one ..... die
There ..... days* ..... (———) ..... {are
There ..... (———) ..... (———) ..... {———

0

———} ..... (———) ..... (———) ..... live*
You ..... spring ..... good ..... spent

the whole list. Thus, in the first line under *4*, the word "life*" stands for the "experience, life, history" group, and the word "wish*" stands for the "wish, hope, long, pray" group. Using key words in this way makes it possible to actually know what one has given a certain combination of words, even though he did not write out in full each combination as it came up.

In making use of this sort of scheme the grader has at first to watch the key words carefully. For instance, if he met the sentence "*There* are times in the *years* of almost *all* of us when we *prepare* for a long life," he would have to find "years" in the group whose key word is "days," and "prepare" in the group whose key word is "seek." Then looking for the combination "There.....days*..... all.....seek*," he would find that it was rated as a high 3 and would score his sentence as 3.

One very soon comes to recognize about where any combination comes in his scheme of values, and then it is not necessary to hunt out each time the combinations of key words. In fact, one has to guard against depending too much on his mechanical device and failing to exercise his judgment at all. It would be almost impossible as well as very confusing to try to keep a record of each variation that occurred. Some objective record of one's judgments is necessary, but it is very easy to get so many that they hinder rather than help, especially in the lower quality specimens.

After the sentences were graded, they were grouped, for purposes of calculation, into eight groups of seven sentences each. I shall hereafter refer to these eight groups as the eight sections, for each group was treated as an independent unit in the record. The first section, then, was composed of the first seven sentences; the second section, of sentences 8–14; the third section, of sentences 15–21; the fourth section, of sentences 22–28; the fifth section, of sentences 29–35; the sixth section, of sentences 36–42; the seventh section, of sentences 42–49; and the eighth section, of sentences 50–56. Since each sentence which was perfectly completed received a score of 5 and there were seven sentences in each test, a perfect score in any section would

be 35. In this way eight scores of from 0 to 35 were obtained for each child.

The score of each child in each of the eight sections was then expressed in terms of the performance of public-school children in the same test. If, for instance, a child had made a score of 30 in the first section, 25 in the second, and 28 in the third, he was recorded as having done as well in the first section as the median public-school child 9.3 years old, and in the third section as well as the median public-school child 9.6 years old.

Derivation of Standards.—The standards of performance by public-school children were obtained from tests given during April and May to 850 children in Public School No. 68 and Public School No. 43, Manhattan. The tests given the public-school children were the same as those given to the dependent children, were given in the same way, under practically the same conditions, and were graded by the same standards.

A typographical error in the 25th sentence as it appeared on the test sheets given to some of the children in the public schools made it necessary to leave it out of the calculations entirely. For this reason the fourth section as here reported consisted of sentences 22, 23, 24, 26, 27, and 28, and a perfect score in this test would be 30 rather than 35.

The score made by each public-school child in each of the eight sections was determined, as in the case of the dependent children, by adding the grades made in each of the seven sentences composing the section. A table of distribution was made for each of the eight sections, showing the number of times each score (0, 1, 2, 3, 4, 5, 6, 7–35) was made by all the children together, by the children of each age, and by the children of each age in each school grade. The following table (Table III.) of distribution is a portion of the distribution for section V. The entire table for each section ranges from age seven to age fourteen, and from Grade 2*A* to Grade 8*B*, but this small portion showing the performance of ten- and eleven-year-old children in one of the sections, will be sufficient to illustrate the method that was used.

Reading across the top of Table III. from left to right, one sees that the score of 0 was made by two ten-year-olds in the 3*A* grade, by one of the same age in the 3*B* grade, and by another in the 4*B* grade, making a total of four ten-year-old children who failed to make any score at all on the fifth section. All of the eleven-year-old children who were tested in the public schools made some score above 0 in this section. An examination of the column headed Total shows that six ten-year-old children made a score of 1, five a score of 2, four

TABLE III

DISTRIBUTION OF SCORES IN SECTION V., SENTENCES 29–35., OF PUBLIC-SCHOOL CHILDREN OF AGES 10 AND 11 YEARS (10.0 TO 11, AND 11.0 TO 12)

	Age 10									Age 11								
Score	3A	3B	4A	4B	5A	5B	6A	6B	Total	3A	3B	4A	4B	5A	5B	6A	6B	7A	Total
0	2	1		1					4										
1		1	4	1					6	1				2	1				4
2	1	2	1	1					5		2	2							4
3	1	1	1		1				4				2						2
4	1	1	1			1			4			1	1		1				3
5	1		3	1		1			6		2	1	1	1					5
6	1	3	4						8				1		1	1	2		5
7		1	2		2				5			1			1				2
8			2						2			1			2		2		5
9			1			1			2			1		1	2		1		5
10				4	1	1			6				2		1				3
11			1	1		1			3			1	1	2	5	1			10
12				1		2	1		4				1	2	5	2	2		12
13						4	2		6						1	2	1		4
14			1			1	1		3					2	2		1		5
15						1	1		2						2		2		4
16						1			1					1	4	1			6
17			1			1			2						2	1	1		4
18			1						1						1		1		2
19																	2		2
20					1			1	2					1		1			2
21			1				1		2									1	2
22				1					1										
23															2			1	3
24						1			1								1		1
25																			
26							1		1										
27																			
28																			
29																			
30																			
31																			
32																			
33																			
34																			
35																			
No. of Cases.	7	10	24	11	5	16	7	1	81	1	4	8	9	12	33	9	17	2	95
Med. Score..	3	3.5	6	10	7	13	14		7			6	6	11.5	12	13	14		11

a score of 3, etc. There is a surprisingly large amount of variation in the score made by ten-year-old children. An examination of the table shows that a child is more likely to make a good score in this section of the completion test if he is in the fifth or sixth school grade than he is if he is only in the third or fourth grade. This indicates

that there is some relation between the ability which this test measures and the judgment of the school authorities who promote children from grade to grade. This has since been proved definitely to be the case, and to a fairly high degree.

As a single figure to indicate the ability of the children here tested, the median seems best. The median child is that child whose ability is central,—who has just as many above him in ability as he has below him. Since there are eighty-one children ten years old, the median child will be the forty-first in the column of totals. Counting downward from the low scores toward the high ones, one finds the forty-first to be the fourth one of the five who made a score of seven, so that the median child ten years old made a score of seven. The mode, or the score most frequently made by these same children, was 6. In a similar way the median of the scores made by eleven-year-old children in this section of the completion test will be found to be 11, and the mode 12.

The median score made by all the ten-year-olds tested is probably not the best representative of the ability that should be shown by children ten years old, for the children tested were not truly representative of all ten-year-old children in every respect. More classes were tested in the lower grades than in the upper, so that ten-year-old children who were in the higher grades and who would have made good scores did not have the weight of numbers that those in the lower grades had. It seems likely therefore that 7 is somewhat too low.

In order to reduce the chance of errors of this kind, it seemed best to use the median of the scores made by *those children who had made normal progress in school.* An examination of the ages of the children in the schools tested seemed to indicate that normal progress in these schools would put the child in the 1*B* and 2*A* grades at the age of seven, 2*B* and 3*A* at eight, 3*B* and 4*A* at nine, 4*B* at ten, 5*A* and 5*B* at eleven, 6*A* and 6*B* at twelve, 7*A* and 7*B* at thirteen, and 8*A* and 8*B* at fourteen. These grades were used as "normals" in the calculations which follow. Reference to the medians for each grade of ten-year-olds at the bottom of Table III shows that the median score of ten-year-old children who are in the 4*B* or normal grade is 10. The number of cases is too small to fix this definitely, but reference to other medians show that it is not far wrong. In a similar way the median score in section V. of those eleven-year-old children who have made normal progress and were in the 5*A* and 5*B* grades, is 12.

"Ten-year-old children" here means those children who are from 10.0 up to 11.0 years old, therefore those averaging 10.5 years. Similarly the eleven-year-olds average 11.5 years. To say that

eleven-year-olds who have made normal progress make a median score of 12 in section V. really means then, that children 11.5 years old should make a better score than 12 as often as they make a poorer. In a similar way the twelve-year-old children, who average 12.5 years old and are in the sixth grade, make a median score of 14 in section V. The medians found for each normal age group in each one of the eight tests were as follows:

TABLE IV

MEDIAN SCORES IN EACH SECTION OF THE COMPLETION TEST FOR EACH YEAR-AGE. GROUP OF ORDINARY CHILDREN

Age	I	II	III	IV[4]	V[4]	VI[4]	VII[4]	VIII[4]
8.5	24	14	19	15	4	4	0	0
9.5	30	26	28	18	5	5	2	0
10.5	30[5]	30[5]	31[5]	21[5]	10[5]	7[5]	4[5]	0[5]
11.5	31	30	32	23	12	14	8	2
12.6	34	31	31	23.5	14	15	8.5	5.5
13.5	34	32	33	26	17	18	16	13
14.5	34.5	34	32	27	21	20	17	11

The gain in score from the lower ages to the higher is not always constant in these tests, or rather it does not appear constant in the medians shown above. One of the main reasons for this irregular

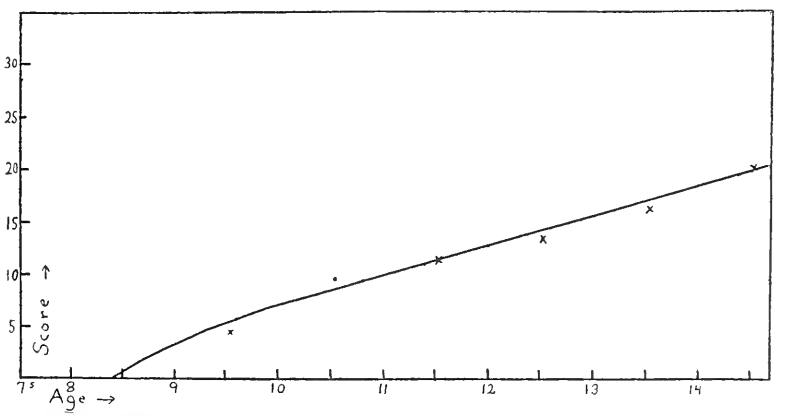

FIG. 4. A cross indicates a median established by normal age group containing two school grades. A dot indicates a median established by normal age group containing only one school grade. The curve as given has been smoothed out by reference to factors determining the medians.

progress is the small number of pupils used in determining these points. The points fixed by the above medians were plotted so as to

[4] Sections IV.–VIII. were not given to the children in the second grade, so that the medians here given for children 8.5 years old are somewhat high.

[5] Medians for children 10.5 years old are less reliable than others, for they are based on the records of only eleven children.

show the curve of rising ability as the children become older, and then the irregularities of these curves were smoothed out by reference to the facts connected with their determination and the laws of probability. The graph on p. 19 shows the medians established for section V. and will serve very well to show how the curve was smoothed out in the case of all eight sections.

It will be noticed that in drawing the curve relatively more weight is given to the medians established for children 11.5 and 14.5 years old than is given to the others. This is because these two medians were more accurately determined and depend on a larger number of cases. The median for age 8.5 does not depend on all the normal progress group; for the 2*B* children were not given this test, and therefore this median, determined by using the brightest half of the normal progress pupils, is probably a few points too high. For that reason the smoothed curve passes below the median determined.

After smoothing out each section's curve as carefully and accurately as possible, it was again turned into a table of values. This table (Table V.) shows approximately the normal age of a child who makes a given score in each of the eight sections of the completion test.

By means of this table one can easily turn the gross score made by a child in any one of the eight sections into a "normal age" figure which is not far from accurate. It must, however, be borne in mind that these standards are for children of normal age and grade in the two particular public schools which were tested. It is probable that further tests in other schools will modify these values.

The crude score obtained by each of the dependent and delinquent children in each of the eight tests was turned into a normal-age figure by means of Table V. It was not expected that the boy who did as well as a normal child 9.2 years old in the first section would do exactly the same as the normal child 9.2 years old in the second and all the following sections of the test. Many factors enter in to make the result obtained by the same person in the same sort of work different at different times. For comparison with other tests, however, a single figure indicating the central tendency of the individual's ability is desirable. Here again the median is the best expression of the central tendency and is used to represent the child's ability in completing these sentences. If a child is recorded as 10.3 in the completion test, it means that he did better than "normal progress" children of that age in these two public schools as often as he did less well than they.

Cases in which no result at all was attained in completing the sentence in certain sections were not counted in calculating the median of the results from the entire eight, unless the median of

TABLE V

AGES CORRESPONDING TO EACH DEGREE OF ACHIEVEMENT IN EACH SECTION OF THE COMPLETION TEST

Sec. No. Score	I	II	III	IV	V	VI	VII	VIII	Score
1		7.6	7.6	7.7	8.4	8.7	9.1	11.3	1
2		7.6	7.6	7.7	8.6	8.8	9.5	11.5	2
3		7.7	7.7	7.8	8.8	9.0	9.8	11.7	3
4		7.8	7.7	7.8	9.0	9.2	10.2	11.9	4
5		7.9	7.8	7.8	9.3	9.4	10.5	12.1	5
6		7.9	7.8	7.9	9.5	9.6	10.8	12.4	6
7		8.0	7.9	7.9	9.8	9.8	11.2	12.6	7
8		8.1	7.9	8.0	10.2	10.0	11.5	12.9	8
9	7.5 —	8.1	8.0	8.1	10.5	10.3	11.9	13.2	9
10	7.5	8.2	8.0	8.2	10.8	10.5	12.2	13.6	10
11	7.6	8.3	8.1	8.3	11.2	10.7	12.5	14.0	11
12	7.6	8.4	8.1	8.4	11.5	11.0	12.9	14.7	12
13	7.7	8.4	8.2	8.5	11.9	11.3	13.2	14.5 +	13
14	7.7	8.5	8.2	8.7	12.2	11.7	13.5		14
15	7.8	8.6	8.3	8.9	12.6	12.2	13.9		15
16	7.9	8.6	8.3	9.1	12.9	12.7	14.2		16
17	7.9	8.7	8.4	9.3	13.2	13.2	14.5		17
18	8.0	8.8	8.5	9.5	13.6	13.6	14.5 +		18
19	8.1	8.8	8.6	9.8	13.9	14.1			19
20	8.1	8.9	8.7	10.2	14.3	14.5			20
21	8.2	9.0	8.7	10.5	14.6	14.5 +			21
22	8.3	9.0	8.8	11.0	14.5 +				22
23	8.4	9.1	8.9	11.5					23
24	8.5	9.2	9.0	12.3					24
25	8.6	9.3	9.2	13.1					25
26	8.7	9.5	9.3	13.8					26
27	8.8	9.9	9.4	14.5					27
28	9.0	10.3	9.6	14.5 +					28
29	9.2	10.8	9.8						29
30	9.9	11.5	10.1						30
31	10.9	12.3	10.5						31
32	11.9	13.0	11.5						32
33	12.9	13.8	14.5						33
34	13.9	14.5	14.5 +						34
35	14.5 +	14.5 +							35

those sections in which an effort had been made was within .3 of a year of being as high as the lower limit of the scale for the section which had not been touched. For example, if a child had shown a median ability of 9.2 in the first seven sections, it would not be expected that he would make any score in section VIII., for the child who made a score of 1 in section VIII. was as often older than 11.3 as younger. If the median of the results for the first seven sections was above 11.3, however, the child clearly had sufficient ability to at least

attempt the eighth test, and failure to do so was counted the same as if he had attempted it and failed. If the median of the results of the first seven sections was between 11.0 and 11.3, we used our best judgment as to whether section VIII., being left untouched, meant a failure or lack of ability to try,—that is, whether to count it as a low score and use it in calculating the median, or to ignore it and calculate the median on the basis of the first seven sections.

Any section which was not touched was treated in the same manner. If the median result for those sections which were attempted was equal to or higher than the age figure for a score of 1 in the section in question, the test was used counting as a failure in calculating the median given in this report. But if the median result of the other section was lower than the age figure for a score of 1 in the section in question by more than .3 of a year, the section was not used in calculating the median reported. If the median of the other sections, however, was not quite as high as the lowest age figure of the section in question, but was within .3 of a year of it, it was counted or not according to the best judgment that could be made concerning it.

The various steps of this rather elaborate system of scoring may be illustrated by the three following cases, beginning with the gross totals obtained for the eight sets of seven sentences each.

	Gross Totals for Sets of 7 Sentences							
Individual	1-7	8-14	15-21	22-28	29-35	36-42	43-49	50-56
A	15	8	17	15	2	4	0	0
B	29	28	30	24	14	11	0	0
C	16	13	18	4	1	1	0	0
D	35	33	33	28	18	14	13	8

	Inferred Completion-Ages on the Basis of Each Set of 7 Sentences							
Individual	1-7	8-14	15-21	22-28	29-35	36-42	43-49	50-56
A	7.8	8.1	8.4	8.9	8.6	9.2	9.1—	11.3—
B	9.2	10.3	10.1	12.3	12.2	10.7	9.1—	11.3—
C	7.9	8.4	8.5	7.8	8.4—	8.7	9.1—	11.3—
D	14.5+	13.8	14.5	14.5+	13.6	11.7	13.2	12.9

Individual	Median Inferred Mental Age by Completion Test as a Whole
A	8.5
B	10.3
C	8.2
D	13.7

The Binet-Simon Tests

The Goddard revision of the Binet-Simon tests was the third series of tests used, the following being the procedure:

The Binet tests were given to boys 1–50 between the 18th and 25th of July, to boys 51–98 between the 18th and 24th of June, to boys 99–141 between the 24th and 30th of June, and to boys 142–183

between the 7th and 19th of December. The girls numbered 200 to 256 were given the Binet tests on the 6th, 7th, 8th, and 17th of July, and the girls numbered 257–281, on the 18th, 22d, 24th, and 25th of the same month. Sixteen of the boys and thirty of the girls were tested by Mr. Stenquist, the rest by Mr. Trabue.

The Binet tests were uniformly given at least a day after the class tests (described elsewhere), so that the examiners were not strangers to the children tested. The examiner sat at a table in one of the classrooms with which the children were thoroughly familiar, and no one but the child to be examined came in, except occasionally when some errand kept one of the officers of the institution busy in some distant part of the room. A chair was provided for the child to sit comfortably at the table beside the examiner, and every possible effort was made to have the external conditions as pleasant as possible.

The hours for testing were from nine until twelve o'clock in the morning and from one until five-thirty o'clock in the afternoon. The time required to give the tests to each child varied from a half hour to three quarters of an hour, according to the age and condition of the child being tested.

The method adopted for giving the tests was in general that described by Dr. Henry H. Goddard in *The Training School,* January, 1910. The forms for keeping the child's record and the weights, pictures and other apparatus for giving the tests were those furnished by the C. H. Stoelting Company, of Chicago. The procedure was as nearly the same in each case as was possible without making the examiner a mere automaton.

The pleasant spirit of earnest effort which had been present in the class tests appeared also in these individual tests. Without exception the children appeared to enjoy doing just as they were asked to do, and their efforts were uniformly encouraged, whether they were successful or otherwise. The child was not informed even by the examiner's tone whether he had answered the question correctly or not. The child was allowed to see that his words were sometimes copied, but he was never allowed to see any mark indicating success or failure.

As each child came into the room to be tested he was greeted by a smile and a "Good morning," or "Good afternoon," from the examiner. The chair in which the child was to sit was pushed back to emphasize the verbal invitation, which was usually given in these words: "Come right up and sit down. I'll be ready in a moment—just as soon as I look over this paper." This gave the examiner time to calculate the mental age of the child who had just been examined

and to make any notes necessary concerning his behavior and physical character, and it also gave the new child an opportunity to get adjusted to the situation.

After completing the record of the previous child, a new test sheet was taken and the examiner turned to the child by his side. "Let's see. What is your name?" As this question was asked the examiner turned to his record of the class tests of mechanical ability and endeavored to get on good terms with the child by telling him how well he had done in that test. "Oh yes, Johnny Jones. You did quite well on your other tests. You put the wrench together well, and you set the mouse trap all right, didn't you?"

Taking up the test sheet to write the child's name and age, the examiner continued: "How do you spell your last name, 'J o n e s?' I thought so. When is your birthday, Johnny? 'January 5th.' How old will you be next January, Johnny? 'Twelve.' Then you are about eleven and a half years old now, are you not? And you were born on January 5, 1903. Is that right?" This effort to get things just right, to avoid misspelling the name, and to show a personal interest in the child, usually made the child feel quite at home and removed any tendency to reticence. It was found to be more reliable to ask the child how old he would be at his next birthday than to ask how old he was at his last birthday. It was also found that many of them were not exactly sure of the year in which they were born. Each was fairly sure as to his age, however.

After writing the child's name and date of birth at the top of the sheet, the third piece of information called for was the date. "What date is to-day? Do you know?" If the correct answer was given, the date was written without comment, but if it was not known or was incorrectly given the examiner did not write the date until afterwards, in order that the child should not see that he had made a mistake. Two of the questions already asked constituted integral parts of the test: knowing name (III., 5) and knowing date (IX., 3). Both are so easy, however, that they gave hardly any information about the children we were testing, and the children themselves were not aware that the test had begun.

The standards of performance to be counted as satisfactory and the credit to be given for each test, as well as the form in which the test was presented, were those described by Dr. Goddard, except where study of the methods used by others and the examiner's own experience convinced him that modifications were desirable. It may be understood then, that the tests were identical with those of Goddard, except where mention is made of a different form.

The first test given after filling in the data at the top of the test

sheet, was the test of memory for numbers (III., 3; IV., 3; VIII, 5; X., 3; XII., 1). This test was chosen to be given first because it gives the quickest indication of the child's level of ability, it is easily understood by the child, it begins at a point where any of our children could do it successfully, and it gets the child into an attitude of attention which is very valuable. In many respects this tests is the easiest to administer of the Binet series. The explanation of the test was as follows: "Now, Johnny, I want to see first how many numbers you can remember. I will repeat some numbers while you listen, and as soon as I am through I want you to try to say them just as I did. Now listen." The experimenter always made a point of beginning with such a short list that the child would be sure to remember all, then gradually he increased the number of digits until the child was unable to get all of them correctly in one trial out of three lists of the same length. The time between digits of the same list as pronounced by the examiner was about $\frac{3}{4}$ of a second. Each was pronounced independently, so that no connecting rhythm might aid the child.

Immediately following the test for memory for numbers, the memory tests for sentences were given (III., 2; V., 3; XII., 3). A sentence intermediate between V., 3 and XII., 3, was given (without credit) as follows: "Mary is a splendid little girl. She likes to sew and does it very well."

The results from these two series of memory tests gave a good indication of where to begin with the other tests. For convenience in presenting the tests and in order not to confuse the child by continually changing the method of work, we grouped the tests according to their methods of application into several parallel groups. Each group was given separately, beginning at a point where the child would be sure to be successful, or at least where the memory test had given promise that he would be successful, and going from the easy to the more difficult until the child showed clearly that he was unable to do any that were more difficult. No child was given all the tests of any group, but each was given all those in any group between the point where he showed full ability to do anything easier and the point where he showed complete inability to go higher.

The first of these parallel groups was one in which no apparatus was necessary, the tests being largely conversational in character. This group was composed of the following: III., 1; IV., 1; VI., 1; VI., 4; VIII., 2; VIII., 3; IX., 4; X., 4; XI., 1; XI., 4; XII., 5; XV., 2; XV., 4.

As soon as the child's upper limit in the first group of tests had been found, another series was begun which required more activity on the part of the child. This series consisted of the following tests:

V., 2; V., 5; VI., 4; VII., 4; X., 2; X., 5; XI., 2; XI., 3; XII., 3; XV., 3.

A third group of tests was composed of those having to do with money: V., 4; VII., 1; IX., 1; X., 1. A fourth group of tests was composed of those calling for definitions: VI., 2; VIII., 1; IX., 2; XII., 2.

Another large group of the tests was composed of those which require apparatus or specially prepared objects. These were as follows: III., 4; VII., 2; XV., 1;[6] IV., 2; IV., 4; V., 1; VI., 5; VII., 3; VII., 5; VIII., 4; IX., 5; XI., 5; XII., 4.

As indicated above, this grouping of the tests was made for the sake of convenience in giving them, and does not pretend to divide them according to the abilities which they test. An ascending scale for each sort of ability tested would be very desirable, but the tests for memory of numbers and memory of sentences are the only ones which approach this in the Binet series.

Dr. Goddard gives the child credit for mental ability of the highest age for which all the tests are passed; and .2 of a year additional credit is given for every test above this age. This scheme was followed in calculating the scores of the dependent children, with the additional rule that .2 of a year should be subtracted for every failure below the age in which all the tests had been passed. This was necessary because the method of giving parallel groups of tests rather than age groups discovered the fact that some children who pass all the tests for a given age are yet unable to pass some of the lower tests. It was also rather common for a child to fail on all the tests for a given age and yet pass some of those which were above that age. This possibility seems to have been overlooked by Dr. Goddard, whose instructions are to go down the list until all the tests for a given year are passed and up the list until the child fails in all the tests for a given year.

The mental ages as calculated by the Binet-Goddard scheme are, after 8.6 years, too low for ordinary American children, whatever they may have been for French children. The average or median American child 11 years 0 months old will not score 11.0 by the Binet test, but about 10.6. The average or median child 13.0 years old will not score 13.0, but about 11.4. The available data have been worked up by one of us (see the *Psychological Clinic*, Vol. VIII., No. 7) and show the values of Table VI. to be approximately correct for various Binet scores from 7.0 years to 12.0 years.

Consequently the Binet score for each dependent child has been

[6] The four pictures used were those of the Barber, the Shoemaker, the Butcher and the Gardeners.

transmuted in accordance with Table VI, into the age whose ability it really represents in the case of ordinary American children. These latter we shall call the "*Corrected Binet*" ages.

TABLE VI

Binet Score Computed as Stated Above	Median Age Corresponding Thereto	Binet Score Computed as Stated Above	Median Age Corresponding Thereto
7.0	6.8	9.6	9.8
7.2	7.0	9.8	10.0
7.4	7.3	10.0	10.3
7.6	7.5	10.2	10.5
7.8	7.8	10.4	10.8
8.0	8.0	10.6	11.0
8.2	8.2	10.8	11.6
8.4	8.4	11.0	12.2
8.6	8.6	11.2	12.6
8.8	8.9	11.4	13.0
9.0	9.1	11.6	13.4
9.2	9.3	11.8	13.8
9.4	9.5	12.0	14.2

The Reading Test

The fourth test was of the ability to read certain passages and answer questions or perform acts based on them—a test intended definitely to measure what these children had got from the educational opportunities of school and home. The passages and questions were those of sets *A, B, C, D, E, F, V* and *X*, a printed in the Teachers Collge Record of September, 1914. We shall call this the reading test.

This test gives us in some measure a means of discriminating between constitutional dullness and lack of training. In so far as the children do well in the Binet test where the bulk of the work is oral and do poorly in this reading test, their deficiencies may be assigned to lack of opportunity and stimulus. If, on the other hand, they are just as inferior in the Binet tests as in this reading test, their deficiencies may be probably (not surely) assigned in large measure to inherent lack of capacity. The matter is not sure, for it is not absolutely certain that the abilities required by the Binet test are less dependent on home and school training than those required for intelligent reading.

The reading test was given and scored as follows:

Reading tests *A, B, C, D, E* and *F* were usually given just after the completion tests, although the noon hour intervened in a few instances. The children were provided with pencils and seated at the desks of their regular classroom. The examiner held in his hand a set of the tests and explained to them as follows:

"I am going to give each of you three rather long sheets of paper like these I hold in my hand. I shall place them on your desk face downward, for I do not want you to see what is printed on the other side until everyone is ready and knows what to do. Write your name and age at the top of each one of the papers without turning it over. Do not turn the papers until I tell you. Just write your name and age at the top of the back side of each one of the sheets as it is placed on your desk."

He then placed face downward on each child's desk a complete set of the papers, arranged in order. As he passed them out he warned them again: "Write your name and age, but do not look at the printed side of the papers." He then made further explanations as follows:

"If you have your name and age written on each sheet given you, I will explain what we are going to do. When I give the signal to turn over your papers, you will find printed on the other side some little paragraphs telling stories about someone, and some questions for you to answer about the stories. Suppose the story says that 'John and Mary went to town yesterday,' and then suppose the question asks 'Who went to town?' What would you write? Of course, you would simply write the answer, 'John and Mary,' on the line just after the question. There are six little stories and several questions about each story. Read the little story marked '*A*' first, and then answer the questions about it. Write your answers on the lines following the questions. After you have answered all the questions under story *A*, read story *B* and answer the questions about it. Take them in order; do *A* first, then *B*, then *C*, then *D*, then *E*, and then *F*. Write the answers to just as many questions as you can and make the best answers you can. You will find the answers in the little story, so be sure you understand what the story says. When you have answered all the questions you can, just as well as you can, hold up your hand and I will mark down the time it has taken you to do it. I shall have all of you stop in thirty minutes, but I want to see how many of you will get through before I stop you. Is there any one who does not understand? Then you may all turn your papers over and read the story under *A*."

It was always necessary to go around and help some of the younger children to get started, in spite of the long explanation. In cases where it was necessary to give personal assistance to any child, his paper was marked with an "Expl." As soon as a child had finished all three sheets of the test, the examiner marked on the first page the time it had taken him and took up his papers. At the end of thirty minutes, the signal was given to stop writing and the papers were all collected.

The reading tests *X* and *V* were given immediately after the reading tests had been collected. The examiner held in his hand the two sheets, *X* and *V*, and explained as in the previous case that he would place the papers on their desks face downward, and that they were to write their names and ages on the backs of each sheet given them. After passing out the tests and getting each child to sign them on the back as before, he made this explanation:

"When I give the signal to turn your papers, you will find printed on the other side all the directions as to what you are to do. Just read what it says to do under the letter *V*, and then do it. Be sure to do just what it says and nothing more. Be very careful, for in some places the man who wrote these directions tried to see if he could catch you when you were not thinking. After you have done everything on the sheet marked *V*, take the sheet marked *X* and do what it says to do there. Remember to do just exactly what it says to do. I will give you fifteen minutes to finish both papers, but if any of you get both of them done in less than that time hold up your hand and I will give you credit for finishing ahead of time. Is there any one who does not understand? Then you may all turn your papers over and do what its says to do."

In this case also it was necessary to give personal directions to a good many children, but as before such papers were marked "Expl." so that such assistance could be allowed for in grading the papers. As soon as any child had finished both papers the time it had taken him was marked on the first page and both papers were taken up. At the end of fifteen minutes all the papers were collected.

Scoring.—Scores of 0, 1, 2, 3 or 4 were given to each division of *A, B, C, D, E, F,* and scores of 0, 1 or 2 to the divisions of *V* and *X*, according to adequacy of the child's work.[7] and the scores so given were combined for *B* and *C*, for *D* and *E*, for *F*, and *V* and *X*. By the system used, the maxima obtainable were 64 for *B* and *C*, 72 for *D* and *E*, 32 for *V* and *X*, and 40 for *F*. (*A* was left out of account, it being intended to serve as an introduction to the test proper.) We have, for example, for a certain child 60 points out of a possible 64 for *B* and *C;* 52 out of a possible 72 for *D* and *E;* 13 out of a possible 32 for *V* and *X*, and 16 out of a possible 40 for the difficult *F*. This child would then be given, as his "reading age" by all four scores, the age at which the ordinary child would attain an equal result. For the child in question these reading ages were 9.9, 10.2, 10.7 and 11.6, since the score of 60 in *B, C*, is made by the average child at the age of 9.9 years; the score of 52 in *D, E*, is made by the average child

[7] Details concerning the assignments of the values 1, 2, 3 and 4 may be found in the *Teachers College Record* for September, 1914, pp. 48 ff.

at 10.2 years; the score of 13 in *V, X,* is made by the average child at 11.8 to 12.0 years, and the score of 16 in *F* is made by the average child at 11.6 years.

The standards defining the achievement of ordinary children in these reading tests were obtained from about 700 children tested in a public school on the upper east side of New York City, representing homes of the general intellectual class of small storekeepers, artisans and clerks. As the "average" 9.5 year old, we used the children 9 years 0 months to 9 years 11 months in grades 2*B* and 3*A* in June; as the "average" 10.5 year old, we used the children 10 years 0 months to 10 years 11 months in grades 3*B* or 4*A* in June; and so on as shown below. These grades seemed to represent about the degree of school progress of the average child in the school in question. The results from less advanced and from more advanced children were also given some consideration in determining the standard.

9½-year-olds (9.0 to 9.9) in grades 2*B* and 3*A*	used	to	represent	average ability.
10½-year-olds (10.0 to 10.9) in grades 3*B* and 4*A*	"	"	"	"
11½-year-olds (11.0 to 11.9) in grades 4*B* and 5*A*	"	"	"	"
12½-year-olds (12.0 to 12.9) in grades 5*B* and 6*A*	"	"	"	"
13½-year-olds (13.0 to 13.9) in grades 6*B* and 7*A*	"	"	"	"
14½-year-olds (14.0 to 14.9) in grades 7*B* and 8*A*	"	"	"	"

For example, in the case of the *D* and *E* groups of tests, the data, the procedure and the final standard selected were as follows:

The scores for children 8, 9, 10, 11, 12, 13 and 14 years old (*i. e.,* 8.0 to 8.9, 9.0 to 9.9, etc.) were as in Table VII.

TABLE VII

FREQUENCY OF SCORE ATTAINED IN READING TEST: *D* AND *E* COMBINED BY THE ORDINARY SCHOOL CHILDREN TESTED

	Frequency for 8-year-old Children in Grade						Frequency for 9-year-old Children in Grade						Frequency for 10-year-old Children in Grade								
Score	*3A*	*3B*	*4A*	*4B*	*5A*		*3A*	*3B*	*4A*	*4B*	*5A*		*3A*	*3B*	*4A*	*4B*	*5A*	*5B*	*6A*	*7A*	
40 or less.	6						3	2	3				2	2	3						
41 or less.	1								1					1	1		1				
42 or less.								1													
43 or less.	1														1						
44 or less.	1	1						1													
45 or less.	1														1						
46 or less.	1								1												
47 or less.		1						1	1						1	1					
48 or less.								1								1					
49 or less.		1							1						3	1					
50 or less.								3								1					
51 or less.								4	2								1				
52 or less.	1	1						1						1			2				
53 or less.		1						3							1			1			
54 or less.									1							1		1			
55 or less			1				1	1		1					1			1			
56 or less.								2	1					1	2		1	1			
57 or less.							1	2	2	1							1	1			
58 or less.	1	1							1								2				
59 or less.		1															3	1			
60 or less.							1	1	1				1		1	2	3				
61 or less.	1	1							2							1	1				
62 or less.		2						2	1							2	1				
63 or less.		1						1						1			2				
64 or less.								1	4	2					1	1	4	4			
65 or less.										1	1					2	1				
66 or less.		1			1				1	1	1			1		1	1		1		
67 or less.		4						1							1		1				
68 or less.			1						3	2					1	1	5			2	
69 or less.		1	1					1			1					1	1	2			
70 or less.	1		1					1		1							3	1			
71 or less.																	1				
72 or less.		1						1	1					1			4	1			
N.	15	18	4	0	1	(38)		30	27	9	3	(69)		3	8	18	17	39	14	1	2 (102)
Median Score	43	62	68.5		66			53	58	65	66		40 or less	54	49	62	64	64	66	68	

TABLE VII (*Continued*)

	Frequency for 11-year-old Children in Grade											Frequency for 12-year-old Children in Grade											
	3B	4A	4B	5A	5B	6A	6B	7A	7B			3A	3B	4A	4B	5A	5B	6A	6B	7A	7B	8A	
40 or less..		2											2	1				1			1		
41 or less..																							
42 or less..																							
43 or less..					1																		
44 or less..																							
45 or less..														2									
46 or less..																							
47 or less..																	1						
48 or less..		1															2	1					
49 or less..																	1						
50 or less..			1	1	1												1						
51 or less..			1	1	1																		
52 or less..																1	1				1		
53 or less..		1			1									1					1				
54 or less..				1												1							
55 or less..		2			1														1				
56 or less..				2	1	1	1							1		1	1			1	1		
57 or less..					1									1					1				
58 or less..	1	1		1								1					1		1	1	3		
59 or less..	1			2	3	2									1		2				1		
60 or less..		2		1		1		2					1			2	3	2	3		2		
61 or less..						1												2			1		
62 or less..				1	3	1	1										1		3	1	1		
63 or less..				1	3		1									1	1	1			1		
64 or less..			2	2	6	2										2	1	3	1	2	2		
65 or less..				2	1		1									1	1			1	2		
66 or less..				1	1		1												3	1	3		
67 or less..			1	2	2	2		2									1		2	1		3	
68 or less..	1			7	5	2	2										1	3	1	4	1	3	
69 or less..									1					1				1		2		1	
70 or less..					2	2											1	1		2		5	2
71 or less..						2		1									1		1	1	2	1	
72 or less..	1	1		3	1	3	1	1	1								4	4		5	2	2	
N	4	10	5	28	34	19	8	6	2	(116)		1	3	7	1	17	26	14	29	12	34	2	(146)
Median	4																						
Score	63.5	55	64	65	64	67	65.5	67	70.5			58	low	53	59	65	61	63.5	67	65.5	66	70	

TABLE VII (*Continued*)

	Frequency for 13-year-old Children in Grade											Frequency for 14-year-old Children in Grade								
	3B	4A	4B	5A	5B	6A	6B	7A	7B	8A		4A	4B	5A	5B	6A	6B	7A	7B	8A
40 or less..		1		1	1			1				1							2	
41 or less..																				
42 or less..																				
43 or less..					1			1						1						
44 or less..																				
45 or less..							1	1												
46 or less..																				
47 or less..																			1	
48 or less..		1																		
49 or less..																				
50 or less..																		1		
51 or less..																				
52 or less..																				
53 or less..					1				1						1					
54 or less..							1								2					
55 or less..			1		1		1		2										1	
56 or less..	1				1	1	1		1						1		1	1		
57 or less..									1					1				1	1	2
58 or less..								2	1											
59 or less..								3	3											
60 or less..				1		1		1	2											
61 or less..									2								1			
62 or less..									3	1				2					1	
63 or less..					2	2	2		2										2	1
64 or less..			1	2	2		3		1	1					2			2	2	1
65 or less..				1	1				1								1		2	
66 or less..						1	1		1	1							1	2	2	1
67 or less..					2			2	3	5						1		1	5	
68 or less..					1	2	2	2	7							3	4	1	2	2
69 or less..					3				3					1				1		
70 or less..							3	4	3	1									2	1
71 or less.							1		1										2	2
72 or less..	1			1	5	1	8	6	6	2				1		1	1	1	4	3
N	1	2	2	6	21	8	24	23	44	11	(142)	1	0	6	6	5	10	12	27	13
Median																				
Score	56	45?	59.5	64	67	64.5	69	68	67.5	67		40 or less		62	55	68	67	65	67	68

For 9-year-olds in 3*A* the median score was 43.
For 10-year-olds in 3*B* and 4*A* median score was 51.5.
For 11-year-olds in 4*B* and 5*A* median score was 65.
For 12-year-olds in 5*B* and 6*A* median score was 62.5.
For 13-year-olds in 6*B* and 7*A* median score was 68.
For 14-year-olds in 7*B* and 8*A* median score was 67.

In consideration of the facts for the other children and of the fact that no nine-year-olds in 2*B* were tested, the standards for ordinary children were set as shown in the *DE* column of Table VIII.

TABLE VIII

ESTIMATES OF SCORES ATTAINED IN READING TESTS BY ORDINARY CHILDREN OF EACH AGE: MADE ON THE BASIS OF RECORDS FROM 700 CHILDREN IN A CITY SCHOOL

Age		Test			
Yr.	Mo.	*B+C*	*D+E*	*V+X*	*F*
9	0	52	43	8	?(10 or less)
	1	52	44	8	?(10 or less)
	2	53	44	8	?(10 or less)
	3	54	45	8	?(10 or less)
	4	54	46	9	?(10 or less)
	5	55	47	9	?(10 or less)
	6	55	47	9	?(10 or less)
	7	56	48	9	?(10 or less)
	8	57	48	9	?(10 or less)
	9	58	49	10	?(10 or less)
	10	59	49	10	?(10 or less)
	11	60	50	10	?(10 or less)
10	0	61	50	10	?(10 or less)
	1	62	51	11	?(10 or less)
	2	63	52	11	?(10 or less)
	3	63	52	11	?(10 or less)
	4	63	53	11	?(10 or less)
	5	63	54	12	?(10 or less)
	6	63	54	12	?(10 or less)
	7	63	55	12	?(10 or less)
	8	63	55	13	?(10 or less)
	9	63	55	13	?(10 or less)
	10	63	56	14	?(10 or less)
	11	63	56	14	?(10 or less)
11	0	63	57	15	10 or less
	1	63	57	15	11
	2	63	57	16	12
	3	63	58	16	13
	4	63	58	17	14
	6	63	59	17	15
	5	63	59	17	15
	7	63	60	18	16
	8	63	60	18	17
	9	63	60	18	18
	10	63	60	19	19
	11	63	61	19	20
12	0	63	61	19	20
12	1	63	61	20	21
	2	63	62	20	22
	3	63	62	20	23
	4	63	62	21	24
	5	63	63	21	25
	6	63	63	21	25
	7	63	64	21	25
	8	63	64	21	25
	9	63	64	22	26
	10	63	64	22	26
	11	63	64	22	26
13	0	64	65	22	26
	1	64	65	22	26
	2	64	65	22	27
	3	64	65	23	27
	4	64	66	23	27
	5		66	23	27
	6		66	23	27
	7		66	23	27
	8		66	23	27
	9		66	23	28
	10		66	24	28
	11		66	24	28
14	0		67	24	28
	1		67	24	28
	2		67	24	29
	3		67	25	29
	4		67	25	29
	5		67	25	29
	6		67	25	29
	7		67	25	30
	8		67	25	30
	9		67	26	30
	10		67	26	30
	11		67	26	30
15	0		68	26	30
	1		68	26	30

A pupil who scored under 43 in the *DE* composite was thus rated as of low reading-age in so far forth. A pupil who scored 44 is rated in so far forth as of reading age 9.1; a pupil scoring 45 is rated as of reading age 9.3; and so on. For scores of 64 or better the determination by this test alone is very inexact, since a slight carelessness, cutting his score by 3 or 4, penalizes the pupil by even two or three

TABLE IX

THE FACTS OF TABLE VIII, ARRANGED FOR CONVENIENT USE IN DETERMINING "READING AGES" FROM GROSS SCORES IN THE READING TESTS

B + C		*D + E*		*V + X*		*F*	
Score	Age	Score	Age	Score	Age	Score	Age
51 or less.	Under 9.0	40 or less.	Under 9.0	7 or less.	Under 9.0	9 or less.	?
52	9.1	43	9.0	8	9.1	10	11.0
53	9.2	44	9.1	9	9.5	11	11.1
54	9.3	45	9.3	10	9.9	12	11.2
55	9.5	46	9.4	11	10.2	13	11.3
56	9.6	47	9.5	12	10.5	14	11.4
57	9.7	48	9.6	13	10.7	15	11.5
58	9.8	49	9.8	14	10.9	16	11.6
59	9.8	50	9.9	15	11.1	17	11.7
60	9.9	51	10.1	16	11.2	18	11.8
61	10.0	52	10.2	17	11.4	19	11.9
62	10.1	53	10.3	18	11.7	20	12.0
63	10.3 to 13.0	54	10.5	19	11.9	21	12.1
64	13.0 or over	55	10.7	20	12.2	22	12.2
		56	10.9	21	12.5	23	12.3
		57	11.1	22	13.0	24	12.4
		58	11.3	23	13.5	25	12.5
		59	11.5	24	14.0	26	12.9
		60	11.8	25	14.4	27	13.4
		61	12.0	26	14.9	28	13.9
		62	12.3	27	?	29	14.4
		63	12.5	28	?	30	?
		64	12.8	29	?	31	?
		65	13.1	30	?	32	?
		66	13.6	31	?	33	?
		67	14.5	32	?	34	?
		68	?			35	?
						36	?
						37	?
						38	?
						39	?
						40	?

? = "probably over 15.0, may be much higher."

years of reading age. This is of little consequence in measuring the dependent children, however, since scores of 64 or better were extremely rare in their case. In every case the harder *VX* and *F* series are available for pupils scoring high in the *DE* test; and the *BC* combination score is available for those scoring low in the *DE* test.

Similar data to those of Table VII. were computed for the ordinary children for the *B–C*, *V–X*, and *F* series. The final result is a table for assigning four reading-age estimates on the basis of the four scores made in *B–C*, *D–E*, *V–X*, and *F*. This table (Table VIII.) on page 34 is intended to give values such that if all ordinary children

were tested by the methods used for the dependent groups, as many at each age would be above the standard set as below it.

In actual use the facts of Table VIII, are used in the form of Table IX.

From his four scores in *BC, DE, VX,* and *F,* four estimates of reading age are recorded for each dependent child, using Table IX. Thus, for boys *X, Y* and *Z* scoring as follows:

	Gross Scores			
	BC	*DE*	*VX*	*F*
X	18	0	1	0
Y	62	53	11	6
Z	62	52	26	30

We have

	Reading Ages by			
	BC	*DE*	*VX*	*F*
X ...	Very very low.	Very very low.	Very very low.	?
Y ...	10.1	10.3	10.2	? (under 11.0)
Z ...	10.1	12.3	14.9	? (over 15 probably)

As a single "reading age" each child was assigned that age which seemed most probable from these four separate ages. This single age was sometimes the average of the four, but not as a rule. For the *BC, DE, VX* and *F* tests are of different amounts of significance for different degrees of ability. A child who does well with *F* and *VX,* aging 10.7 and 11.6 for example, should not be brought down because a single omission of a question in the very easy *BC* test brings him down by 4, or to age 9.9, there. This omission or error was probably a mere slip. Again, a child who makes a perfect record in *BC* may be anywhere from reading age 13.0 on. A child who fails entirely with *F* may be anywhere from reading age 10.0 down. For a child of good ability *F* and *VX* are the best indices; for a child of fair ability, *VX* and *DE;* for a child of low ability, *DE* and *BC;* for a child of very low ability, *BC* alone. One of the authors (Thorndike) estimated for each child the "reading age" which seemed the most probable. With the children of low ability all estimates are rough, and at times only a V. L., which may mean anything from 8.5 down, was all that could be stated.

For example for child *X* the estimated total reading age was simply "very very low" (v. l. v.); for child *Y,* it was 10.2; for child *Z,* it was 13.6.

There are many other details concerning methods of scoring the construction, completion and reading tests and estimating the average achievement of ordinary children of each age in these three tests which it would be advisable to present here, were it not for the fact that

we expect to improve and extend these tests and to get easier methods of adequate scoring and more exact standards. The reading test, for example, has already been much improved by one of us (see the *Teachers College Record* for September, 1914), and the completion test will be published in a well-graded fully standardized series within a year. Experience is showing that these tests when so improved are of very great value, and the construction tests promise to be of possibly even greater value. For the present purpose it is sufficient to have explained roughly the process by which the dependent and delinquent children are given a construction age, Binet age, completion age and reading age in terms of the achievements of ordinary children, so far as we were able to measure the latter.

One matter, however, may be worth mention in this connection. The critical reader will have noted that there is a difference between the grade taken as "normal" for a given age in the case of the reading test and that taken in the case of the completion tests using a different school. In the latter school the children entered school at a younger age or were advanced more rapidly, or both, so that apparently the average 9.5-year-old child there was to be found in grade 3*B* and 4*A*, the average $10\frac{1}{2}$-year-old child in grade 4*B*, the average $11\frac{1}{2}$-year-old child in grade 5*A* and 5*B*, and so on as shown on page 18.

The matter of standards is of course very important in both cases. If we take the nine-year-olds in grades 1, 2, 3, 4 and 5 we shall find for either test a marked rise in ability as we go from grade to grade. Entrance to school and progress in school are due to intellect; and any test of intellect, to be standardized for the average or median child, must be studied in the case of children of average school progress. This however is in part subject to conventions that vary from school to school. The average age of entrance to the schools used by Mr. Trabue in securing standards for the completion test seems to be much below that for New York City at large, for example. If we are misled into using for our standards children in too high grades, our standards will be too high and our ratings of the defendent and delinquent children too low. The reverse holds if we use children in too low grades. It seemed best for Mr. Trabue to use his best judgment and for Mr. Thorndike to do likewise. An authoritative settlement of the standards can come only from the measurement of more ordinary children. The possible effect of these standards being too high or too low will be kept in mind in all conclusions stated in this article. If there are any such errors they are probably such as to make the "Binet" ages assigned to the dependent children too high, the "omitted-word" ages too low, and the "reading" ages too high.

The Results

So far we have described the tests and the procedure whereby for each test each dependent or delinquent child is rated as at the age at which an average child would make the score which the dependent child made. The results in the form of years and tenths of a year of under- or overageness for each child are given in Table X., columns 6, 7, 8 and 9. The chronological age was determined by the child's statement, corroborated or modified by the records of the institution or county wherever possible. This was not always possible. Of the cases where some more or less official record of age could be had, 59 per cent. agreed with the age as stated by the child himself. The discrepancies were as often up as down, so that the average result from uncorroborated ages may be taken as valid. The records for individuals are subject to wrong inferences where his statement of age is in error, half of the time toward making him seem duller than he is, half of the time toward making him seem brighter than he is. There is reason to believe that the semi-official age is often simply a record of age based on a previous statement by the child. There is also reason to believe that the semi-official record is often in gross error (as when a large boy in a high grade who says he is fourteen is recorded as only seven). Consequently, when we put the mental status of each child in terms of "underageness," we use as his chronological age the average of his own statement and the report of the institution or county-records, or, if the two differ by three years or more, choose the one which best fits his bodily appearance and score in the tests. Since we have entered in Table X. the age by each source of information, anybody who desires can repeat all computations using either age.

Table X. gives also in column 5 each child's average underageness, using the corrected-Binet, completion and reading tests together. This combination of the three into a single measure is justifiable, since the correlations between these three tests are high. In certain cases a median rather than an average is used because of the indefiniteness of one of the three measures.

The nature of the commitment was for destitution in the case of individuals 1–50, 81, 100, 101, 107, 108, 109, 112, 114, 115, 116, 122, 123, 124, 126–130, 134, 136–140, 200–275, 277, and 278. In all other cases it was for delinquency.

TABLE X.

THE STATUS OF EACH OF 265 DEPENDENT CHILDREN IN TESTS OF ABSTRACT AND MECHANICAL INTELLECTS. NOS. 1–183 ARE BOYS. NOS. 200–281 ARE GIRLS

(An * before the identification number means commitment by an officer of the court. A question mark in place of the month-figure for an age indicates that the month was not recorded or known by the child, as the case may be.)

Identification Number	Age Reported by County Officers	Age Reported by Child	Age Used in Computing Underageness Estimates	Underageness in Three Tests of Abstract Intellect Combined (+ Equals Overageness)	Underageness in Mechanical Test (+ Equals Overageness)	Underageness in Binet Test	Underageness in Completion Test	Underageness in Reading Test
1	2	3	4	5	6	7	8	9
1	14.2	14.2	14.2	— 2.7	— 8.7	— .8	— 3.5	— 3.8
2	12.7			— .1	+ 2.1	+ 1.1	— .9	— .6
3	9.7	10.3	10.0	— 1.3	+ 4.5	— .7	— 1.7	— 2.0
4	13.8			— 3.0	— 3.0	— 3.5	— 3.0	— 2.6
5	10.4	10.4	10.4	+ .1	— 1.5	+ .4	— .5	+ .4
6	10.2	15.8	10.2	— 1.1	— 2.9	— 1.1	— .6	— 2.2
7	9.9	9.8	9.8	+ .4	+ 3.4	— .5	+ .6	— 1.0
8	14.?			— .8		—	0	— 1.6
9	9.7	9.8	9.8	— 1.8	— 3.1	— 1.7	—	— 1.8
10	12.3	12.2	12.2	0	+ 1.4	— 1.7	— .4	+ 2.2
11	11.2			+ 1.1	— .8	+ 1.0	+ 2.7	— .4
12	14.0			— 3.1	— 2.2	— 3.5	— 4.4	— 1.5
13	14.3	14.0	14.1	— 1.6	+ 1.1	— 1.9	— .6	— 1.6
14	12.3			— 1.2	+ 2.3	— .1	— 2.7	— .7
15	12.?			— 2.7			— 2.9	— 2.6
16	13.?			+ .2			— 1.6	+ 1.0
17	13.9	13.8	13.8	+ 1.8	— 1.3	+ .8	+ ?	+ 2.7
18	10.7			— 1.6	— 1.4	— .4	— 2.0	— 2.1
19	12.0	13.3	12.7	— 2.7	— 1.0	— 2.4	— 3.4	— 2.2
20	12.7	12.7	12.7	— 1.1	+ .3	— .5	— 1.7	— 2.2
21	10.3	10.3	10.3	+ .1	+ 1.3	+ .2	0	0
22	13.6			— .3	+ 3.4	+ ?	— .8	— 1.3
23	9.9			+ .1	+ 3.5	— .4	— .1	+ .9
24	15.2			— .9	— .4	— 1.0	— 3.1	+ 1.3
25	12.8	12.8	12.8	— 2.9		— 3.0	— 2.9	— 2.8
26	12.7			— 2.4		— 1.9	— 2.7	— 2.6
27	14.?			— 3.0			— 3.3	— 2.5
28	11.5	10.?	11.0	— .3	— 3.4	— 1.5	+ .9	— .2
29	13.0			— 1.8	+ 3.3	— 2.7	— 1.4	— 1.4
30	13.?			— 3.9	— 3.1	— 3.7	— 4.5	— 3.4
31	14.3			— 2.5			— 2.9	— 2.2
32	13.9			— 3.3			— 4.5	— 2.1
33	16.6			— 3.3	+ .7	— 3.8	— 3.5	— 3.7
34	10.?			— 2.1			— 2.8	— 1.5
35	10.9			— .5	+ .4	— .1	— 1.3	0

TABLE X (*Continued*)

Identification Number	Age Reported by County Officers	Age Reported by Child	Age Used in Computing Underageness Estimates	Underageness in Three Tests of Abstract Intellect Combined (+ Equals Overageness)	Underageness in Mechanical Test (+ Equals Overageness)	Underageness in Binet Test	Underageness in Completion Test	Underageness in Reading Test
1	2	3	4	5	6	7	8	9
36	11.3	11.2	11.2	+ .3	— .9	+ .4	— .3	+ .7
37	12.0			+ 1.3	+ 2.3	+ 2.2	+ .8	+ 1.0
38	10.5			— 1.0	— 3.6	— 1.2	— .3	— 1.4
39	9.8			— 1.8	— 1.5	— 1.6	— 2.0	— 1.8
40	9.?	10.?	10.0	— 2.5	— 2.7	— 2.7	— 2.4	— 2.0
41	13.1	13.2	13.2	+ 1.9	— 1.5	+ 1.4	+ 1.1	+ 3.3
42	14.3			— 2.4	— 1.3	— 3.3	— 2.6	— 1.2
43	10.5	10.5	10.5	— .1	— 2.7	0	— 1.0	+ .6
44	12.5	12.4	12.4	— 2.1	— 2.1	— 2.1	— 2.5	— 1.7
45	13.5	14.?	14.0	+ .6	— 1.2	— .6	+ ?	— 1.6
46	14.?			— .4				
47	10.5	10.4	10.4	+ .2	— 2.6	— .2	— .6	+ 1.4
48	13.1	13.2	13.2	— 3.9	— 1.6	— 3.9	— 4.5	— 3.2
49	10.8	10.9	10.9	— 1.5	— 2.2	— 1.4	— 1.8	— 1.3
50	10.3			— 1.2	— .6	— 1.0	— 1.0	— 1.5
*51	15.8			— 6.1	— 1.1	— 5.5	— 6.7	— 6.1
*52	15.1	15.1	15.1	— 3.5	— 1.5	—2.3	— 5.2	— 3.0
*53	14.3			— 6.0	— 1.8	— 5.9	— 5.8	— 6.3
*54	13.2	13.2	13.2	— 2.0	— 1.0	— .8	— 4.0	— 2.2
*55	12.?			— 2.2			— 2.1	— 2.4
*56	15.1			— 5.5	+ 1.9	— 4.1	— 5.7	— 6.7
*57	14.3			— 2.8	— .7	— 2.3	— 4.2	— 1.7
*58	14.7	14.7	14.7	— .3	— 1.6	— 1.1	— 1.0	+ 1.3
*59	14.2	12.3	13.3	— 4.1	+ .8	— 2.5	— 4.6	— 5.3
*60	16.4	16.0	16.2	— 4.1	+ .6	— 3.4	— 4.8	— 4.0
*61	15.2	15.2	15.3	— 4.2	— .5	— 4.3	— 4.1	— 3.3
*62	16.6	15.6	16.1	— 3.6	— 3.1	— 2.9	— 4.6	— 3.2
*63	13.4	12.4	12.9	— 3.0	— 2.6	— 2.4	— 3.4	— 3.3
*64	13.6			— 4.2	+ 3.6	— 4.5	— 4.6	— 3.5
*65	14.2	14.2	14.2	— 2.4	— 1.5	— 3.2	— 3.0	— 1.1
*66	15.5	15.5	15.5	— 2.4	+ 1.2	— 1.5	— 2.7	— 3.1
*67	14.6	14.7	14.6	— 3.0	— .3	— 2.4	— 3.8	— 2.9
*68	15.7	14.6	15.2	— 4.1	— 4.1	— 4.2	— 4.2	— 3.8
*69	15.4			— 2.1	— 2.5	— 1.4	— 3.6	— 1.4
*70	16.1	14.3	15.2	— 6.1	— 2.5	— 5.7	6.9	5.4
*71	14.3			— 5.4	— 1.6	— 5.7	— 5.7	— 4.7
*72	15.1			— 4.0	— 1.3	— 2.7	— 5.1	— 4.3
*73	13.5	13.4	13.4	— 2.1	— 2.8	— 2.6	— 1.7	— 2.1
*74	15.5			— 4.4	— 4.3	— 4.5	— 4.9	— 3.8
*75	12.4	14.3	13.4	— 2.8	— 1.0	— 1.8	— 3.3	— 3.4

TABLE X (*Continued*)

Identification Number	Age Reported by County Officers	Age Reported by Child	Age Used in Computing Underageness Estimates	Underageness in Three Tests of Abstract Intellect Combined (+ Equals Overageness)	Underageness in Mechanical Test (+ Equals Overageness)	Underageness in Binet Test	Underageness in Completion Test	Underageness in Reading Test
1	2	3	4	5	6	7	8	9
*76	14.5			— .6	+ 2.2	— .3	— 2.0	+ .4
*77	16.3			— 6.2	— 3.6	— 4.7	— 6.5	— 7.3
*78	13.3			— 4.3	+ 3.4	— 3.5	— 5.6	— 3.7
*79	15.4			— 5.9	— 4.2	— 5.4	— 5.4	— 6.9
*80	14.7			— 3.8	— 4.4	— 3.7	— 3.7	— 3.0
81	15.8			— 6.4	— 2.2	— 5.5	— 7.0	— 6.8
*82	15.8			— 4.1	+ 1.7	— 3.6	— 4.4	— 4.4
*83	13.7	13.7	13.7	— 1.7	— 3.1	— .5	— 3.1	— .4
*84	13.7			— 4.5	— 3.6	— 3.9	— 5.0	— 4.5
*85	13.6			— .4	+ 3.4	0	— .3	— .8
*86	15.2	15.2	15.2	— 3.8	— 2.2	— 1.2	— 5.1	— 5.2
*87	14.8	14.7	14.7	— 3.5	— 4.9	— .3	— 4.5	— 5.4
*88	15.0	13.9	14.5	— 5.4	— 2.1	— 5.4	— 6.2	— 5.5
*89	14.1	7.1	14.1	— 3.7	— .3	— 3.8	— 5.4	— 2.0
*90	15.3			— .4	+ 3.2		— 1.9	— .4
*91	16.3	16.3	16.3	— 7.0	— 3.9	— 7.7	— 7.3	— 6.1
*92	12.8	11.0	11.9	— 3.2	— 2.1	— 3.0	— 3.2	— 3.3
*93	14.?			— 5.9			— 5.8	— 6.0
*94	12.?			— 4.2			— 4.0	— 4.5
*95	13.7	12.7	13.2	— 1.3	+ 3.6	— .8	— 2.7	— .5
*96	13.0	13.1	13.1	— .2	+ .5	+ .1	— .6	— .1
*97	13.6	14.3	14.0	— .5	— .7	— 1.2	— 1.4	+ 1.0
*98	16.1			— 3.1	+ .9	— 3.1	— 5.1	— 1.1
*99	10.5	11.0	10.7	— 2.8	— 2.6	— 2.7	— 3.0	— 2.7
100	13.5			— 4.0	— 5.5	— 4.0	— 4.7	— 3.4
101	13.3	13.0	13.1	— .1	+ 1.5	+ .7	— .5	— .4
*102	15.8	15.7	15.7	— 6.7	— 1.4	— 5.9	— 7.2	— 7.1
*103	11.7	11.8	11.8	— .1	+ .4	+ 1.6	— 1.5	— .5
*104	11.1	11.1	11.1	— 2.1	+ .2	— 1.1	— 2.4	— 2.7
*105	12.5	12.9	12.7	— 2.1	— 2.3	— 1.7	— 2.2	— 2.3
*106	10.9	10.8	10.8	— .2	+ 1.7	+ .2	— 1.8	+ 1.0
107	12.3	12.3	12.3	— 2.6	+ 4.3	— 1.8	— 2.8	— 3.3
108	12.6	12.6	12.6	— 2.7	+ 1.0	— 1.0	— 4.0	— 3.0
109	11.0	11.0	11.0	— 1.3	— .8	+ 1.2	— 2.6	— 2.5
*110	13.5	10.1	11.8	— 3.1	— 4.6	— 2.3	— 4.0	— 3.8
*111	11.3			— 2.8	— 5.7	— 2.9	— 3.1	— 2.3
112	10.3			— 1.3	— 3.3	— 1.4	— 1.9	— .6
*113	12.5	11.8	11.8	— 1.2		— 1.8	— 2.6	+ .8
114	8.0			— 1.2	+ 1.1	—	—	—
115	14.0			— 3.9	— 5.2	— 3.7	— 4.2	— 3.7

TABLE X (*Continued*)

Identification Number	Age Reported by County Officers	Age Reported by Child	Age Used in Computing Underageness Estimates	Underageness in Three Tests of Abstract Intellect Combined (+ Equals Overageness)	Underageness in Mechanical Test (+ Equals Overageness)	Underageness in Binet Test	Underageness in Completion Test	Underageness in Reading Test
1	2	3	4	5	6	7	8	9
116	14.2			— 4.9	— 6.0	— 4.9	— 5.8	— 4.0
*117	13.9			— 3.1	— 1.7	— 2.9	— 3.6	— 2.7
*118	9.5	9.4	9.4	— 2.1	— 1.6	— 2.1	—	—
*119	11.6	12.8	12.1	— 1.1	+ .4	— 1.3	— 2.3	+ .3
*120	8.1	8.1	8.1	— 1.9	— .1	— 1.9	—	—
*121	12.3	10.8	11.6	— 1.6	+ 2.2	— 1.8	— 1.7	— 1.4
122	9.3	7.3	7.3	— 1.1	+ .4	— 1.1	—	—
123	9.7	9.7	9.7	0	— 1.9	+ .1	— 1.0	+ 1.0
124	7.0			+ 1.6	+ 2.2	+ 1.6	+ 1.7	—
*125	10.4	9.3	9.3	— 1.0	— .1	— .4	— 1.6	—
126	11.7	9.3	10.5	— 3.2	— 1.3	— 2.3	— 1.9	— 1.7
127	10.5	9.6	10.0	— .6	— 1.2	0	— 1.5	— .2
128	8.9	8.9	8.9	— .6	— 1.7	— .1	— .6	—
129	13.2	14.0	13.6	— 3.3	— 2.8	— 4.1	— 4.8	— 2.1
130	11.2	10.7	11.0	— .5	— 1.8	— 1.0	— 1.2	+ .8
*131	13.0	11.2	12.1	— 3.1	— 2.9	— 2.8	— 4.0	— 2.6
*132	10.9	11.1	11.0	— 2.5	— 5.2	— 1.7	— 3.3	—
*133	14.1			— 3.2	— 1.4	— 1.7	— 4.6	— 3.4
134	13.0			— 4.2	— 4.5	— 4.2	— 4.6	— 3.8
*135	11.5			— 1.4	— 2.7	— 2.0	— 2.8	+ .6
136	11.8			— .8	+ .7	— .8	— 2.6	+ 1.1
137	13.3			— .6	+ .5	+ .3	— 3.3	+ 1.1
138	12.5			— 4.5	— 2.2	— 5.0	— 4.1	— 4.5
139	10.7	10.7	10.7	— .4	+ .2	— .7	— 1.2	+ .6
140	14.2	14.2	14.2	— 3.3	— 2.0	— 3.2	— 3.3	— 3.4
*141	10.2	10.0	10.1	— .5	— 2.3	— .6	— 2.6	+ 1.6
*142	12.5	12.5	12.5	— 4.6	+ 1.6	— 3.9	— 4.6	v.l.
*143	12.5	12.6	12.6	— 2.6	— 1.2	— 2.6	— 3.1	— 2.1
*144	15.6	15.6	15.6	— 4.5	— 2.0	— 4.0	— 6.6	— 2.8
*145	9.2	10.2	9.2	— 1.7	— .1	— 1.2	v.v.l.	v.v.l.
*146	13.5	15.5	15.5	— 1.7	— 1.7	— 1.7	— 1.1	— 2.2
*147	16.2		16.2	— 2.7	— 3.0			
*148	16	?	16.2	— 6.2	— 1.6	— 8.7	— 8.2	— 7.7
*149	15	?	14.2	— 8.0	— .6	— 8.2	— 7.5	v.i.v.
*150	12.7	12.7	12.7	+ 1.9	+ 4.2	+ 1.1	+ 1.8	+ 2.7
*151	11	9.9	10.9	— 3.2	— 2.4	— 3.1	— 3.2	v.l.
*152	16.2	16.2	16.2	— 2.6	— 3.0	?	— 3.7	— 2.6
*153	11.7	11.7	11.7	— 3.4	— .8	— 3.9	— 2.7	— 3.7
*154	13.1	12.1	13.1	— 4.3	— 1.3	— 3.8	— 4.6	— 4.4
*155	11.9	10.9	11.9	— 2.5	— .0	— 2.8	— 2.7	— 2.0

TABLE X (*Continued*)

Identification Number	Age Reported by County Officers	Age Reported by Child	Age Used in Computing Underageness Estimates	Underageness in Three Tests of Abstract Intellect Combined (+ Equals Overageness)	Underageness in Mechanical Test (+ Equals Overageness)	Underageness in Binet Test	Underageness in Completion Test	Underageness in Reading Test
1	2	3	4	5	6	7	8	9
*156	8 +	8 +	8.5	.0	+ 2.4	— .1	— .1	+ .3
*157	10 +	11.0	11.0	— 3.3	— 4.1	— 3.0	— 3.3	v.l.v.
*158	13	12.7?	12.7	— 1.0	— 1.6	— 2.7	— .5	+ .1
*159	14.7	14.7	14.7	— 5.8	— .4	— 4.9	— 6.4	— 6.2
*160	17.2	15.7	16.7	— 6.7	— 3.7	— 7.4	— 7.0	— 5.8
*161	12.		12.2	+ 1.3	+ .8		.8	+ 3.3
*162	15.2	15.2	15.2	— 2.9	+ 1.7	— 2.6	— 4.3	— 1.7
*163	12.3	12.3?	12.3	— 2.9	+ .5	— 1.8	— 3.3	— 3.6
*164	11.3	11.3	11.3	— .7	.0	— .8	— 1.8	+ .4
*165	11.6	11.6	11.6	— 2.6	— 1.0	— 7.6	— 3.6	v.l.
*166	15.3	15.3	15.3	— 7.8	— 7.5	— 7.8	— 7.8	v.l.v.
*167	15.8	15.8	15.8	— 7.0	— 2.8	— 5.0	— 8.1	v.l.
*168	14.0	16.0	15.0	— 3.9	— 1.7	— 2.0	— 4.2	— 5.4
*169	16.9	16.9	16.9	— 4.4	.0	— 4.3	— 3.5	— 5.4
*170	11.9	11.9	11.9	— 4.4	+ .5	— 4.1	— 4.4	v.l.v.
*171	16.3	16.3	16.3	— .8	— 1.7	?	— 1.8	+ .2
*172	16.2	16.2	16.2	— 3.8	— .7	— 3.2	— 4.4	— 3.9
*173	16.1	16.1	16.1	— 4.9	+ 1.0	— 5.1	— 5.6	— 4.0
*174	14.0	14.3	14.3	— 2.4	+ 1.2	— 1.7	— 3.0	— 2.6
*175	11.	10.3	11.3	+ .4	+ 5.4	+ .9	— .8	+ 1.1
*176	9.2	9.2	9.2	+ 1.2	+ .8	+ 1.6	+ 1.0	+ 1.0
*177	15.1	14.1	14.1	— 1.0	+ 1.1	— 2.5	— 2.4	+ 1.8
*178	16	?	16.0	— 9.0	— 4.7	— 7.2	— 8.5	v.l.v.
*179	16		16.2	— 1.5	+ 1.1		— 1.7	— 1.4
*180	13.3	13.3	13.3	— 1.1	+ 2.9	— .7	— 3.2	— 2.4
*181	11.?	10.6	11.6	— 3.0	— 1.0	— 3.4	— 2.8	— 2.8
*182	13.?	13.9	13.9	— 4.0	— 2.4	— 3.6	— 4.1	— 4.3
*183	12.6	12.6	12.6	— 2.6	+ 1.5	— 2.6	— 3.4	— 1.7
200	10.5	10.5	10.5	+ .4	— 1.2	+ .5	— .1	+ .7
201	15.3	15.0	15.2	— 4.1	— 3.8	— 4.9	— 5.8	— 4.5
202	10.?	11.8	11.8	— 1.0	— 2.1	— 1.3	— 1.6	— .0
203	13.8	13.8	13.8	— 1.9	— 2.1	— 2.8	— 2.3	— 1.5
204	10.1	10.3	10.2	— .5	— 1.3	— .9	— .4	— .3
205	11.3	11.0	11.2	— 2.0	— 4.2	— 1.7	— 2.3	— 2.1
206	14.3			— .6	+ .2	+ .3	+ .2	— 2.3
207	12.4	12.0	12.4	— 2.5	— 3.4	— 2.6	— 2.6	— 2.3
208	9.0			— .6	— 3.5	+ .3	— 1.2	— 1.0
209	11.5			— 1.5	— 5.5	— 2.2	— 1.1	— 1.2
210	14.2			— 5.0	— 7.6	— 5.1	— 5.1	— 4.7

TABLE X (*Continued*)

Identification Number	Age Reported by County Officers	Age Reported by Child	Age Used in Computing Underageness Estimates	Underageness in Three Tests of Abstract Intellect Combined (+ Equals Overageness)	Underageness in Mechanical Test (+ Equals Overageness)	Underageness in Binet Test	Underageness in Completion Test	Underageness in Reading Test
1	2	3	4	5	6	7	8	9
211	15.3			— 5.8	— 3.6	— 5.3	— 6.3	— 5.8
212	12.0			— 1.7	— 3.0	— 1.7	— 1.8	— 1.6
213	10.6	10.7	10.7	— 1.9	— 2.7	— 1.4	— 2.1	— 2.2
214	13.0	13.1	13.1	— 4.3	— 4.8	— 4.9	— 4.3	— 3.8
215	10.?	10.7	10.7	— 2.6	— 3.1	— 2.1	— 3.1	— 2.7
216	11.1	12.1	11.6	— .6	— 4.1	+ 1.4	— 1.4	— 2.3
217	13.2			— 3.8	— .4	— 3.4	— 4.0	— 4.1
218	9.1			— .5	— 2.3	— .7	— .2	— .6
219	9.5	9.4	9.4	— .2	— 1.3	— .3	— .3	+ .1
220	11.0	11.0	11.0	— .5	— 2.7	— .2	— 1.2	— .1
221	13.0			— 2.8	— 2.5	— 2.5	— 4.2	— 1.7
222	14.9	14.7	14.8	— .1	— 1.0	— 1.0	0	+ .5
223	9.4	9.4	9.4	+ .7	— 1.3	+ 3.2	— .9	— .2
224	11.2			— 2.8	— .2	— 2.3	— 3.6	— 2.7
225	10.?			— 2.0			— 2.6	— 1.5
226	14.4			— 2.8	— 1.7	— 4.4	— 3.9	— 2.1
227	14.3			+ .2	+ .2	— 4.4	— 3.9	— 1.8
228	12.9	12.9	12.9	— 3.2	— 3.6	— 3.1	— 3.0	— 2.4
229	8.7	9.9	9.8	— .3	— 1.6	+ .7	— .1	— .3
230	10.2			— .8	— 3.1	+ .1	— 1.2	— 1.4
231	12.1	12.1	12.1	+ 1.4	— 3.1	+ .9	+ .8	+ 2.4
232	11.2	11.2	11.2	— 2.9	— 5.4	— 1.9	— 3.5	— 3.2
233	8.?			— .6			— .6	— .5
234	11.7	11.8	11.8	— 1.2	— 4.0	— 1.8	— .8	— .9
235	14.5			— 3.3	— 1.3	— 2.3	— 4.0	— 3.7
236	10.8			— 1.7	— .4	— 1.5	— 2.2	— 1.3
237	12.3	11.7	12.0	+ 1.2	— 5.6	+ 1.0	— .5	+ 3.0
238	9.0			— .7	+ 1.5	— 1.0		— .5
239	11.8			— 2.4	— 1.8	— 1.5	— 3.1	— 2.6
240	9.8			+ 2.8	+ 1.7	+ 4.0	+ 1.1	+ 3.2
241	10.2			— 2.4	— 5.2	— 2.4	— 2.4	— 2.2
242	13.4			— 1.3	+ 1.1	— 1.2	0	— 2.7
243	9.8			+ .4		0	+ .7	+ .4
244	11.9			— 3.9	+ 5.2	— 4.1	— 3.8	— 3.9
245	11.0	11.1	11.1	— 3.0	— 5.4	— 2.9	— 2.9	— 3.1
246	11.?			+ 2.3		—	—	+ 1.1
247	13.?			+ 1.0		—	—	+ .5
248	11.3	11.3	11.2	+ .2	— 3.6	— .5	0	+ 1.2
249		12.4	12.4	— 3.5	— .9	— 4.4	— 3.1	— 3.1
250	9.9	9.9	9.9	+ 1.5	— 1.3	— .6	+ 2.7	+ 2.4

TABLE X (*Continued*)

Identification Number	Age Reported by County Officers	Age Reported by Child	Age Used in Computing Underageness Estimates	Underageness in Three Tests of Abstract Intellect Combined (+ Equals Overageness)	Underageness in Mechanical Test (+ Equals Overageness)	Underageness in Binet Test	Underageness in Completion Test	Underageness in Reading Test
1	2	3	4	5	6	7	8	9
251	10.3	10.3	10.3	+ 2.5	+ .8	+ .5	+ 1.8	+ 5.2
252	12.7				— 1.2	+ 1.7	— .4	— 1.4
253	10.3			+ 4.2	+ 1.3	+ 4.3	+ 3.7	+ 4.5
254	12.0			+ 1.3	— 2.7		+ 1.3	+ 1.3
255	13.8			— .6	+ 2.5	— .4	— .2	— 1.3
256	11.7			— .7	— .8	— .1	— 1.2	— .7
257	12.0			— 2.6	— 2.7	— 2.2	— 3.1	— 2.5
258	11.3	14.1	11.3	— 1.0	— 2.7	— .8	— 1.2	— 1.0
259	10.0			— 2.4	— 4.1	— 3.2	— 2.0	— 2.0
260	11.6			— 2.7	— 1.3	— 1.8	— 3.6	— 2.6
261	9.7	12.0	9.7	— .3	— 1.0	— 1.3	— 1.0	+ 1.4
262	10.?							
263	11.7	12.6	12.6	— 3.8	— 6.9	— 4.4	— 3.9	— 3.1
264	13.6			— 3.3	— 4.7	— 3.6	— 4.2	— 2.7
265	11.0	14.0	12.5	— 1.3	— 4.9	— 1.5	— 2.3	— .1
266	12.0			— 3.3	— 2.8	— 2.5	— 3.5	— 4.0
267	12.?			— 3.0			— 3.8	— 3.3
268	12.7			— 4.1	— 3.0	— 4.3	— 4.4	— 3.7
269	10.?	10.1	10.1	— 2.3	— 3.4	— 2.3		— 2.1
270	14.1	13.0	13.6	— 2.8	— 3.2	— 3.1	— 3.8	— 1.6
271	16.?	17.2	16.8	— 6.1	— 5.1	— 5.2	— 8.0	— 6.9
272	11.7	10.7	10.7	— 2.1	+ .8	— 1.6	— 2.6	— 2.2
273	11.6			— 2.7	— 4.0	— 3.0	— 3.2	— 2.0
274	12.3			— 4.8	— 6.5	— 4.8		— 4.3
275	10.5	10.4	10.4	— 1.4	— 3.8	— 1.8	— 1.6	— .8
*276	12.5	12.4	12.4	— 3.1	— 6.6	— 2.4	— 4.0	— 3.4
277	9.?			— 1.5	— 1.9	— 1.1	— 1.9	— 1.5
278	9.9	10.9	10.4	— 1.5	— 2.6	— .6	— 2.3	— 1.8
*279	16.3	11.0	13.7	— 5.1	— 7.2	— 5.1	— 5.1	— 5.2
*280	14.7	12.6	13.7	— 4.5	— 6.8	— 3.7	— 4.8	— 4.9
*281	13.4	11.4	12.4	— 1.3	— 1.8	— 1.8	— 3.0	+ .9

These dependent children as a group are much below ordinary children of corresponding ages in the sort of abilities tested by the Binet, completion and reading tests. They differ of course among themselves. We find one child of much promise, forty-nine of nearly average ability or better, while forty-eight are four years or more behind, and the remaining three fifths are from half a year to four years behind. The nine and ten year old dependents average about

seven tenths of a year behind New York City children of the poorer classes; the eleven- and twelve-year-olds average about two years behind; the thirteen and fourteen-year-olds average about two and a half years behind; the fifteen- and sixteen-year-olds average about four and a half years behind.

The variation amongst the dependent children, and their general tendency to be much below ordinary children are shown clearly in Table XI.

TABLE XI

THE NUMBER OF DEPENDENT CHILDREN OF EACH DEGREE OF SUPERIORITY AND INFERIORITY TO THE MEDIAN OF NEW YORK CITY CHILDREN OF POOR NEIGHBORHOODS WHEN MEASURED BY THE BINET, OMITTED-WORD, AND READING TESTS COMBINED. THE SAME FACTS IN PERCENTAGES OF THE NUMBER TESTED OF THE AGE IN QUESTION.

	9 and 10 Years Old[8]		11 and 12 Years Old		13 and 14 Years Old		15 and 16 Years Old	
	No.	%	No.	%	No.	%	No.	%
4 up to 4.5 years above their age...	1	1.8						
3.5 up to 4 years above their age...								
3 up to 3.5 years above their age...								
2.5 up to 3 years above their age...	2	3.6						
2 up to 2.5 years above their age...			1	1.2				
1.5 up to 2 years above their age...	1	1.8	1	1.3	2	2.8		
1 up to 1.5 years above their age...	1	1.8	5	6.2	1	1.4		
.5 up to 1 years above their age...	1	1.8						
0 up to .5 years above their age...	7	12.7	4	5.0	2	2.8		
0 up to .5 years below their age...	8	14.5	4	5.0	7	9.9	1	2.4
.5 up to 1 years below their age...	8	14.5	6	7.5	4	5.6	1	2.5
1. up to 1.5 years below their age...	7	12.7	11	13.7	4	5.6		
1.5 up to 2 years below their age...	9	16.4	3	3.8	4	5.6	2	4.9
2 up to 2.5 years below their age...	3	5.5	17	8.7	5	7.0	2	4.9
2.5 up to 3 years below their age...	4	7.3	18	22.5	7	9.9	3	7.3
3 up to 3.5 years below their age...	2	3.6	12	15.0	11	15.5	2	4.9
3.5 up to 4 years below their age...	1	1.8	3	3.8	7	9.9	4	9.8
4 up to 4.5 years below their age...			3	3.7	7	9.9	8	19.5
4.5 up to 5 years below their age...			2	2.5	3	4.2	2	4.9
5 up to 5.5 years below their age...					4	5.6		
5.5 up to 6 years below their age...					2	2.8	3	7.3
6 up to 6.5 years below their age...					1	1.4	5	12.2
6.5 up to 7 years below their age...							3	7.3
7 up to 7.5 years below their age...							2	4.9
7.5 up to 8 years below their age...							1	2.4
8 up to 8.5 years below their age...							1	2.5
8.5 up to 9 years below their age...								
9 up to 9.5 years below their age...							1	2.4
Number Examined.....	55		80		71		41	
Average Under-ageness.....	.6½		1.8		2.3½		4.6	
Median Under-ageness[9].....	.8		2.4		2.8		4.2	

[8] Also the three 8-year-olds tested were included.

[9] Medians are calculated from original data, scored in tenths of a year.

In the mechanical test also the dependent children are notably inferior, though not so much so as in the more abstract abilities. On the average they are about one and three fourths years behind. The facts by age-groups are shown in Table XII. This test, involving only thirty minutes of work from a child, does not give an exact measure of an individual; hence, some of the best scores are undoubtedly unduly high and some of the worst, unduly low. The general drift of the measures for the group is, however, entirely reliable.

TABLE XII

THE NUMBER OF DEPENDENT CHILDREN OF EACH DEGREE OF SUPERIORITY AND INFERIORITY TO THE MEDIAN OF NEW YORK CITY CHILDREN OF POOR NEIGHBORHOODS WHEN MEASURED BY THE MECHANICAL TEST. THE SAME FACTS IN PERCENTAGES OF THE NUMBERS TESTED OF THE AGE IN QUESTION.

	9 and 10 Years Old		11 and 12 Years Old		13 and 14 Years Old		15 and 16 Years Old	
	No.	%	No.	%	No.	%	No.	%
5.0 up to 5.5 years above their age...			1	1.4				
4.5 up to 5 years above their age...								
4 up to 4.5 years above their age...			2	2.7				
3.5 up to 4 years above their age...	1	1.9			2	3.2		
3 up to 3.5 years above their age...	1	1.9			4		1	2.4
2.5 up to 3 years above their age...					2	3.2		
2 up to 2.5 years above their age...	1	1.9	4	5.5	1	1.6		
1.5 up to 2 years above their age...	3	5.8	2	2.8	1	1.6	3	7.1
1 up to 1.5 years above their age...	3	5.8	2	2.7	4	6.3	3	7.1
.5 up to 1 years above their age...	3	5.8	2	2.8	2	3.2		
0 up to .5 years above their age...	1	1.9	5	6.8	2	3.2		
0 up to .5 years below their age...	5	9.6	2	2.7	4	6.4	2	4.8
.5 up to 1 years below their age...			6	8.2	1	1.6	6	14.3
1 up to 1.5 years below their age...	10	19.2	6	8.2	8	12.7	3	7.1
1.5 up to 2 years below their age...	7	13.5	4	5.5	8	12.7	5	11.9
2. up to 2.5 years below their age...	4	7.7	5	6.9	5	7.9	2	4.8
2.5 up to 3 years below their age...	7	13.5	8	11.0	3	4.8	3	7.1
3 up to 3.5 years below their age...	2	3.9	5	6.8	4	6.3	3	7.1
3.5 up to 4 years below their age...	3	5.8	2	2.8	1	1.6	5	11.9
4 up to 4.5 years below their age...			5	6.9	1	1.6	3	7.1
4.5 up to 5 years below their age...			2	2.7	3	4.8	1	2.4
5 up to 5.5 years below their age...	1	1.9	4	5.5	1	1.6	1	2.4
5.5 up to 6 years below their age...			3	4.1	1	1.6		
6 up to 6.5 years below their age...					1	1.6		
6.5 up to 7 years below their age...			3	4.1	1	1.6		
7 up to 7.5 years below their age...					1	1.6		
7.5 up to 8 years below their age...					1	1.6	1	2.4
8 up to 8.5 years below their age...								
8.5 up to 9 years below their age...					1	1.6		
Number Examined	52		73		63		43	
Average Under-ageness	1.0		1.8		1.4		1.7	
Median Under-ageness	1.3		2.0		1.6		1.7	

Besides the general inferiority of these children which is so clear from Tables X, XI and XII, as to need no further comment, there is a striking increase in their underageness in abstract intellect as we pass from the younger to the older children. The difference is far too great to be a matter of chance, and requires explanation. It is probably due to a combination of causes.

Consider first of all six children, nine, ten, eleven, twelve, thirteen and fourteen years old respectively, each of whom is next to the dullest child of his age in a thousand. Consider similarly six children, nine, ten, and so on, each of whom is the next to the brightest of a thousand of his age. Consider similarly six, each the hundredth child from the bottom, the 10-percentile child of his age; and six, each the hundredth from the top, the 90-percentile child of his age.

The six, equally dull in the sense of being the 0.1-percentiles or the 10-percentiles for their respective ages, would be unlike in their underageness. The 10-percentile child of nine would be about 1½ years behind in the Binet test for example, while the 10-percentile child of fourteen would be over 3 years behind. In progress at school the 99.5-percentile child of eight might have gained one grade, whereas the equally bright child of fourteen would have gained three. For a child to have gained a year in school obviously means different things according to the time he has had to gain it in. A Binet score of 1½ years behind obviously means one thing in a nine-year-old and something much less objectionable in a fourteen-year-old. The same is essentially true of many achievements.

We should call two children of different ages equally inferior or equally superior if they have the same relative position—are the same percentiles—each for his age. Or, in technical terms, the abilities of children of different ages may be made commensurate by expressing each as a deviation plus or minus from the central tendency for his age and as a multiple of the variability of his age.[10]

The increase in underageness as we go from lower to higher ages in the dependent children is greater than would be expected from the increasing range of individual differences in general as we go from lower to higher ages. As Table XI shows, the percentage of children equal or superior to the average child of the age in question is much less at 15 and 16 than at 8, 9 and 10. There are, that is, selective tendencies sending a relatively duller group of 15- and 16-year-olds than of 8-, 9- and 10-year-olds, to county institutions.

[10] The original plan of this study provided for measurements of this sort, but it was thought best to use the simpler and more striking underageness as a surer means of making clear the status of these children.

Possible causes for this selection are: (1) the placing-out of brighter children, removing them from the institutions before they get to the high ages; (2) the earning power of the brighter older children whereby they escape commitment after a family catastrophe which would have caused their commitment if they were young;[11] (3) the indirect influence of heredity, since a bright father and mother might in fifteen or twenty years after marriage save enough to offset the father's death or disability, whereas in ten or twelve years they might not; (4) a possible special tendency of children of this sort to fall behind, with advancing years, more than ordinary children of the same initial dulness, as a result of their nature or their training, or of both.

From the point of view of social economy this excess-dulness of the older children means that being a public charge is more and more symptomatic of dulness, the older the child is. Probably the adults up to beyond the prime of life who are public charges would be found to be even duller than these children of fourteen to sixteen.

[11] Actual full wage earning would be less common than such partial work as would lead a relative to assume the care of a child 15, 14 or even 13, if he or she were capable.

Heredity versus Environment as the Cause of the Low Intellectual Status of Dependent Children

It is probable that each reader has explained the facts so far given by hereditary lack of intellectual gifts or by the deprivations of an unfortunate environment, according to his own prepossessions. Ordinarily a certain heredity carries with it a similar environment, so that the amount of force to be ascribed to either can vary almost at the pleasure of the thinker, until a more intimate analysis is made.

We can to some extent get beneath this superficial quarreling about causes in the case of these dependent children. For we can compare the resemblance of siblings who have been almost exclusively subject, pair by pair, to home training with siblings who have been subject for 2½ years or more to the institutional training. If the resemblance between related children were due in large measure to their having been brought up, within pairs, in the same home and, between pairs, in different homes, the resemblance should decrease with length of stay in the institution.

Consider siblings committed in '09, five years before these tests were given, in comparison with siblings committed in 1914, from 0 to 6 months before these tests were given. We have, for example, J. R., W. R. and R. R. committed at the ages of 9.2, 7.3 and 5.4, now 14.3, 12.3 and 10.5 years old, and on the other hand B. F. and C. F. committed only a few months back, now 12.6 and 11.0; and T. T. and J. T. committed only a few months back, now 13.3 and 11.8. If fraternal resemblance were due to home training the R brothers should show very little resemblance, at least in the reading and completion tests, since nearly all their academic training has been irrespective of home influences. The F. and T. brothers should show much greater resemblance.

We have computed the Pearson coefficient of correlation for the siblings committed in 1907 to 1911 inclusive, and for those committed in 1912, 1913 and 1914 up to the time of the tests, both for the tests of abstract intellect and for the mechanical test, using as the deviates to be correlated the measures of Table X.

There are many complicating factors which make these over- and underageness measures far from satisfactory as deviates, and the relation of the selective forces with respect to the two groups is not sure. But as a first rough test of similar parentage versus

similar home training as a cause of similarity in intellectual and mechanical achievement, the comparison of these coefficients of correlation for the two groups is instructive. There is very little difference. The fraternal resemblance in the group largely subject to home training is greater in the average score in intellect, but less in the score for mechanical ability. On the average it is only ten per cent. higher for the home-trained group. The averages of the coefficients are .69 and .62 respectively. These gross amounts must not be taken as estimates however of fraternal resemblance in general, as the gross amounts of a coefficient of correlation computed by using as deviates the underageness measures of brothers found in this peculiarly selected group may differ notably from the coefficient computed by using as deviates the plus or minus deviations of individuals from the central tendency for their age and sex expressed as a multiple of the variability for their age and sex.

By using only a part (but a part selected at random so far as this issue is concerned) of our material, we can make a more exact comparison. We can choose, for each pair of siblings long freed from home training, a pair of about the same ages long subject to home training. The two groups of pairs so formed give obviously a much safer means of testing the issue at hand, the disturbing influence of increased variability with age and the like being equalized for the two groups.

We have reported in Table XIII the facts for two groups of nine pairs each, so chosen. The result is substantially the same as before. The home-trained show resemblance within sibling pairs greater in the case of the measure of abstract intellect and less in the case of mechanical ability. The averages of the two correlations are alike (+ .55) in both groups.

It appears that, as far as our data go, equilizing opportunity, as by institutional life for five years or more[12] for children 3 to 9 years at entrance upon it, does not reduce original likenesses within families and differences between families to any notable extent.

This conclusion should, of course, be tested with a larger group of children and also by repeated measurements of the same pairs of siblings. In connection with the experimental results when groups of individuals are given equal amounts of practise, however, and the facts for twins,[13] the facts given here put the burden of proof upon

[12] Less than this, however, in so far as any of these children have been returned to their homes since the first commitment and then returned to the institutions.

[13] See, for example, the results found by Thorndike, Whitley, Starch, Wells and Kirby—showing that under equal increments of time given to practise individual differences *increase*, and the fact that twins 11 to 14 years old show little greater resemblance than twins 8 to 10 years old.

TABLE XIII

THE STATUS OF 9 PAIRS OF SIBLINGS LITTLE SUBJECT TO HOME TRAINING COMPARED WITH THE STATUS OF 9 PAIRS OF SIBLINGS MUCH SUBJECT TO HOME TRAINING

Date of Commitment	Sex	Identification	Age at Time of Test	Over- or Under-ageness in Tests of Abstract Intellect	Over- or Under-ageness in Tests of Mechanical Intellect	Date of Commitment	Sex	Identification	Age at Time of Test	Over- or Under-ageness in Tests of Abstract Intellect	Over- or Under-ageness in Tests of Mechanical Intellect
June '07	f	J.K.	12.1	+1.4	−3.1	Jan. '14	m	B.F.	12.6	−2.7	+1.0
	m	M.K.	11.0	− .3	−3.4		m	C.F.	11.0	−1.3	− .8
June '08	f	E.D.	11.6	−2.7	−1.3	Sept. '13	f	M.M.	11.8	−2.4	−1.8
	f	L.D.	9.7	− .3	−1.0		f	A.M.	9.0	− .7	+1.5
Oct. '08	f	A.R.	13?	+1.0		July '14	m	W.W.	13.9	−4.0	−2.4
	f	R.R.	11?	+2.3			m	A.W.	11.6	−3.0	−1.0
Nov. '08	m	R.R.	14?	− .4		July '12	f	M.D.	13.1	−4.3	−4.8
	f	N.R.	11.2	+ .2	−3.6		f	M.D.	10.7	−1.9	−2.7
Mar. '09	m	M.K.	14?	−3.0		Mar. '13	m	P.J.	15.1	−4.0	−1.3
	f	Ma.K.	10.2	− .8	−3.1		f	J.J.	12.0	−3.3	−2.8
June '09	f	Ca.R.	10.4	−1.5	−2.6	June '13	f	E.P.	10.4	−1.4	−3.8
	f	Co.R.	9?	−1.5	−1.9		m	R.P.	8.9	− .6	−1.7
July '09	f	M.S.	12.4	−3.5	− .9	Mar. '14	m	W.N.	11.6	−1.6	+2.2
	f	Mi.S.	9.1	+1.5	−1.3		m	G.N.	8.1	−1.9	− .1
July '09	m	R.W.	14.2	−3.3	−2.0	Oct. '13	f	G.G.	14.8	− .1	−1.0
	m	D.W.	10.7	− .4	+ .2		f	Ge.G.	9.4	+ .7	−1.3
Sept. '09	m	E.V.	13.8	− .6	+2.5	Jan. '14	m	T.T.	13.3	− .6	+ .5
	m	K.V.	11.7	− .7	− .8		m	J.T.	11.8	− .8	+ .7
Feb. '10	f	M.B.	12.4	−2.5	−3.4	Feb. '14	f	M.F.	13.2	−3.8	− .4
	f	A.B.	11.3	−2.0	−4.2		f	F.F.	12.3	−1.2	+2.3

those who attribute any great share in the resemblances found in siblings, under the same general conditions of life during the same decade in the same community, to their similarity in home training.

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